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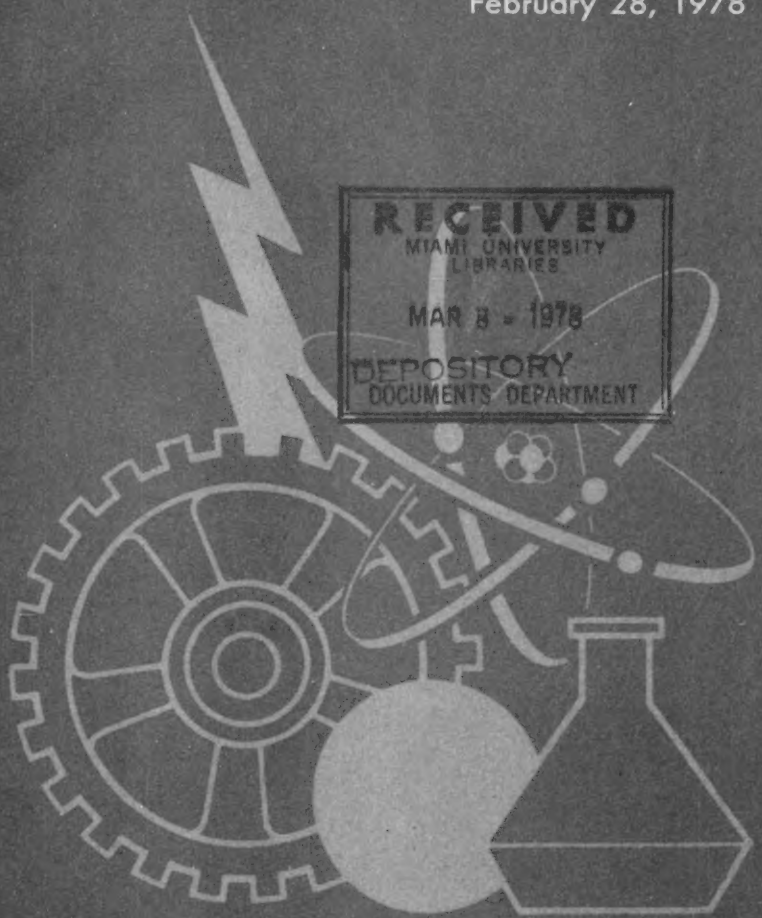
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

February 28, 1978



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

February 28, 1978 Volume 967 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of January 1978

Affirmed	243
Affirmed in Part	39
Reversed	86
Total	368

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,454,081, Re. S.N. 862,218, Filed Dec. 19, 1977, Cl. 165/133, SURFACE FOR BOILING LIQUIDS, Leslie Charles Kun, et al., Owner of Record: *Union Carbide Corp., New York, N.Y.,* Attorney or Agent: James C. Arvantes, et al., Ex. Gp.: 342

3,856,873, Re. S.N. 861,814, Filed Dec. 19, 1977, Cl. 260/668 A, XYLENE ISOMERIZATION, George T. Burress, Owner of Record: *Mobil Oil Corporation, New York, N.Y.,* Attorney or Agent: Charles A. Huggett, et al., Ex. Gp.: 116

PATENT NOTICES

Certificates of Correction for the Week of Feb. 28, 1978

P.P. 4,101	4,034,291	4,048,947	4,055,292
Re. 29,446	4,035,365	4,049,485	4,055,424
3,777,166	4,035,753	4,049,674	4,055,509
3,807,407	4,036,150	4,049,772	4,055,523
3,813,996	4,036,162	4,049,821	4,055,680
3,827,800	4,036,261	4,049,894	4,055,804
3,893,056	4,037,315	4,049,896	4,055,917
3,953,370	4,038,359	4,050,198	4,055,989
3,954,273	4,038,483	4,050,443	4,056,114
3,958,384	4,039,422	4,050,472	4,056,160
3,969,571	4,039,669	4,050,635	4,056,296
3,973,188	4,039,734	4,050,899	4,056,340
3,987,623	4,039,740	4,050,995	4,056,465
3,988,883	4,039,961	4,051,214	4,056,506
3,997,539	4,040,507	4,051,766	4,056,905
3,998,763	4,040,863	4,051,801	4,057,176
3,999,128	4,040,940	4,052,220	4,057,354
3,999,653	4,041,512	4,052,284	4,057,563
4,002,678	4,042,090	4,052,320	4,057,801
4,006,146	4,042,404	4,052,325	4,058,328
4,006,369	4,043,165	4,052,899	4,058,463
4,009,168	4,043,584	4,052,900	4,058,569
4,011,227	4,044,200	4,052,933	4,058,742
4,015,372	4,044,325	4,053,115	4,058,862
4,019,009	4,044,537	4,053,127	4,058,870
4,019,929	4,045,368	4,053,157	4,058,905
4,020,849	4,046,278	4,053,219	4,058,956
4,022,992	4,046,293	4,053,532	4,059,023
4,025,877	4,046,399	4,053,552	4,059,123
4,026,240	4,046,818	4,053,591	4,059,244
4,026,285	4,047,337	4,053,770	4,059,295
4,026,400	4,047,437	4,053,819	4,059,364
4,027,211	4,047,935	4,053,872	4,059,586
4,027,372	4,047,946	4,053,906	4,059,787
4,027,603	4,047,960	4,054,371	4,059,885
4,027,660	4,047,982	4,054,408	4,060,111
4,027,731	4,048,319	4,054,461	4,061,298
4,028,385	4,048,656	4,054,713	4,061,368
4,028,933	4,048,666	4,054,751	4,062,308
4,029,760	4,048,761	4,054,869	
4,033,013	4,048,777	4,054,984	
4,033,930	4,048,808	4,055,273	

Disclaimer

Reissue No. 28,571.—*Kai Lange*, Copenhagen, Denmark. ATTENUATED LIGHT COUPLING BETWEEN SCINTILLATION AND PHOTOMULTIPLIER. Patent dated Oct. 14, 1975. Disclaimer filed Oct. 13, 1977, by the assignee, *General Electric Company*.

Hereby enters this disclaimer to claims 1 to 8, inclusive, of said patent.

Errata

All reference to Patent No. 4,066,612 to Anthony L. Lemper, Gilbert Witschard and Victor A. Pattison of the United States for POST BULK POLYMERIZATION PROCESS FOR POLYVINYL HALIDE AND COMPOSITION THEREOF appearing in the OFFICIAL GAZETTE of January 3, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,066,703 to Tsutomu Shintani, Azuhiro Ozeki, Haruo Kunihiro and Kosuke Shigehiro of Japan for METHOD FOR PRODUCING AROMATIC HYDROXIDE AND ALIPHATIC KETONE appearing in the OFFICIAL GAZETTE of January 3, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,070,725 to Henry Von Den Benken and Elisabeth Von Den Benken of Massachusetts for MACHINE TO WORK ON SHOE SOLES appearing in the OFFICIAL GAZETTE of January 31, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,071,117 to Elmer Chensheng Yang of the United States for MECHANICAL SHOCK ARRESTOR appearing in the OFFICIAL GAZETTE of January 31, 1978 should be deleted since no patent was granted.

All reference to Patent No. 4,071,485 to Walter L. Garrett and Ralph G. Czerepinski of the United States for FOUNTAIN SOLUTIONS AND FOUNTAIN CONCENTRATES FOR LITHOGRAPHIC PRINTING COMPRISING AQUEOUS SOLUTIONS OF POLYACRYLAMIDE BASED POLYMERS, AND BLEND OF POLYACRYLAMIDE AND POLYACRYLIC ACIDS appearing in the OFFICIAL GAZETTE of January 31, 1978 should be deleted since no patent was granted.

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for domestic and possibly foreign licensing in accordance with the licensing policies of the agency-sponsors.

Copies of the patents cited are available from the Commissioner of Patents and Trademarks, Washington, D.C. 20231, for $.50 each. Requests for copies of patents must include the patent number.

Copies of the patent applications can be purchased from the National Technical Information Service (NTIS), Springfield, Virginia 22161 for $4.00 ($8.00 outside North American Continent). Requests for copies of patent applications must include the Patent Application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent and Trademark Office. Claims and other technical data will usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information on a particular invention should be directed to the address cited for the agency-sponsor.

DOUGLAS J. CAMPION,
Patent Program Coordinator,
National Technical Information Service.

NATIONAL BUREAU OF STANDARDS
Patent Advisor's Office, Room A–419, Admin. Bldg.
Washington, D.C. 20234

Patent application 774,094. Magnetic Resonance Detection Method and Apparatus. Filed Mar. 3, 1977.

Patent application 829,381. Six-Port Measuring Circuit. Filed Aug. 31, 1977.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 767,233. Aluminum-Chlorine Thermal Battery. Filed Feb. 9, 1977.

Patent application 800,985. Diffraction Grating Coupled Optically Pumped Laser. Filed May 26, 1977.

Patent application 804,488. Separable Coupling for Plural Pressure Lines. Filed June 7, 1977.

Patent application 806,434. Clutch Protection Circuit. Filed June 14, 1977.

Patent application 806,437. Flared Sonic End Nozzle Velocity Coupling Test Burner. Filed June 14, 1977.

Patent application 817,641. Electronic Indirect Measuring System. Filed July 21, 1977.

Patent application 817,657. Hybrid Perfluoroalkylene Ether Thioimidate Ester Monomers. Filed July 21, 1977.

Patent application 823,556. Improved Method of Using Embedded Normal Stress Sensors in Propellant Grains. Filed Aug. 11, 1977.

Patent application 823,562. Liquid Nitrogen Level Controller. Filed Aug. 11, 1977.

Patent application 826,081. A Load Impedance Intrusion Detection System. Filed Aug. 19, 1977.

Patent application 826,082. Radar Intrusion Detection System. Filed Aug. 19, 1977.

Patent application 826,083. Multiband High Frequency Communication Antenna. Filed Aug. 19, 1977.

Patent application 826,084. Double Acting Locking-Unlocking Actuator. Filed Aug. 19, 1977.

Patent application 826,106. Method of Joining a Fine Wire Filament to a Connector. Filed Aug. 19, 1977.

Patent application 826,107. High Piezoelectric Coupling-Temperature Compensated Berlinite Substrate Member for Surface Acoustic Wave Devices. Filed Aug. 19, 1977.

Patent application 826,108. High Piezoelectric Coupling, Low Diffraction Loss, Temperature Compensated Berlinite Substrate Members for Surface Acoustic Wave Devices. Filed Aug. 19, 1977.

Patent application 826,221. Foil Moderated Radioactive Preionization System for Gas Lasers. Filed Aug. 19, 1977.

Patent application 826,226. Improved Durability Flap and Seal Liner Assembly for Exhaust Nozzles. Filed Aug. 19, 1977.

Patent 4,039,251. Tapered Crystal Modulator for Lasers. Filed Apr. 19, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,043,147. Intershaft Balance Weight. Filed June 15, 1976. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,043,377. Method for Casting Metal Alloys. Filed Aug. 20, 1976. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,043,653. Holographic High Resolution Contact Printer. Filed Jan. 8, 1976. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,044,316. Stabilized Cavity-Dumped Nd:YAG Laser. Filed Apr. 19, 1976. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,044,397. Integrated Circuit Wiring Bridge Apparatus. Filed Aug. 12, 1976. Patented Aug. 23, 1977. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Branch, General Services Div., Federal Bldg., Agricultural Research Service, Hyattsville, Md. 22161

Patent application 833,883. Tetrasulfide Extreme Pressure Lubricant Additives. Filed Sept. 16, 1977.

Patent application 835,103. Preparation of Isopropenyl Esters of Dicarboxylic Acids. Filed Sept. 21, 1977.

Patent 4,039,586. Oxidation of Thiols to Disulfides. Filed Aug. 30, 1973. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,045,554. Process for Preserving Wood Chips During Storage. Filed Sept. 30, 1975. Patented Aug. 30, 1977. Not available NTIS.

U.S. DEPARTMENT OF ENERGY

Assist. General Counsel for Patents, Washington, D.C. 20545

Patent application 617,126. Adhesive Plasters. Filed Sept. 26, 1975.

Patent 3,984,283. Reactor. Filed Feb. 21, 1946. Patented Oct. 5, 1976. Not available NTIS.

Patent 3,993,539. Method and Device for Measuring Fluid Flow. Filed Aug. 7, 1975. Patented Nov. 23, 1976. Not available NTIS.

Patent 3,994,775. Control Rod System Useable for Fuel Handling in a Gas-Cooled Nuclear Reactor. Filed Feb. 25, 1976. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,994,777. Nuclear Reactor Overflow Line. Filed Feb. 12, 1976. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,994,778. Liquid Metal Hydrogen Barriers. Filed July 15, 1971. Patented Nov. 30, 1976. Not available NTIS.

Patent 4,002,912. Electrostatic Lens to Focus an Ion Beam to Uniform Density. Filed Dec. 30, 1975. Patented Jan. 11, 1977. Not available NTIS.

Patent 4,004,250. Laser Action by Optically Depumping Lower States. Filed Nov. 26, 1975. Patented Jan. 18, 1977. Not available NTIS.

Patent 4,008,899. Seal for Permitting Transfer of Tape from One Pressure Region to a Region of Substantially Different Pressure. Filed Jan. 27, 1976. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,011,462. Pulsed Infrared Difference Frequency Generation in CdGeAs sub. 2. Filed Nov. 26, 1975. Patented Mar. 8, 1977. Not available NTIS..

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

National Institutes of Health, Chief, Patent Branch, Westwood Building, Bethesda, Md. 20014

Patent 4,045,630. Chin Activated Switch. Filed Sept. 8, 1975. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,815. System for Combining Analog and Image Signals Into a Standard Video Format. Filed Feb. 4, 1976. Patented Aug. 30, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302 Arlington, Va. 22217

Patent application 754,916. High Input Power Laser Device. Filed Dec. 28, 1976.

Patent application 755,710. Calibration Circuit for Expandable Sonobuoys. Filed Dec. 30, 1976.

Patent application 784,186. Frequency Independent Acoustic Antenna. Filed Apr. 4, 1977.

Patent application 807,863. Transversal Filter Discrete Chirp Frequency Synthesizer. Filed June 20, 1977.

Patent application 816,561. A Fiber-Optic Acoustic Array. Filed July 18, 1977.

Patent application 819,037. Piezoelectric Polymer Flexural Disc Hydrophone. Filed July 25, 1977.

Patent application 821,275. The Improvement of Plaque Dispersing Enzymes as Oral Therapeutic Agents by Molecular Alteration. Filed Aug. 3, 1977.

Patent application 823,568. Holographic Lens Binocular System. Filed Aug. 11, 1977.

Patent application 823,792. Driver for Reactive Load. Filed Aug. 11, 1977.

Patent application 823,907. Single-Sloted Positive Circulation Flap Apparatus for Vectored Thrust Aircraft. Filed Aug. 12, 1977.

Patent application 826,280. Folding Fin Assembly Detent. Filed Aug. 22, 1977.

Patent application 826,608. Modular Guyline Insulator. Filed Aug. 22, 1977.

Patent application 829,756. Radio Frequency Signals Analyzer. Filed Sept. 1, 1977.

Patent application 830,721. Presettable Integrating Timing Circuit. Filed Sept. 6, 1977.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assist. Gen. Coun. for Patent Matters, NASA Code GP–2, Washington, D.C. 20546

Patent application 730,780. Variable Dihedral Shuttle Orbiter. Filed Oct. 8, 1976.

Patent application 779,429. Vortex-Lift Roll-Control Device. Filed Mar. 21, 1977.

Patent application 814,378. Process for the Preparation of Calcium Superoxide. Filed July 11, 1977.

Patent application 817,413. A Complementary DMOS-VMOS Integrated Circuit Structure. Filed July 20, 1977.

Patent application 817,415. Low Intensity X-Ray and Gamma-Ray Imaging Device. Filed July 20, 1977.

Patent application 820,499. Production of Crystals from Molten Solutions. Filed July 29, 1977.

Patent application 823,061. Horizontally Mounted Solar Collector. Filed Aug. 9, 1977.

Patent application 823,566. Partial Polarizer Filter. Filed Aug. 11, 1977.

Patent application 824,024. A Thermal Energy Transformer. Filed Aug. 12, 1977.

Patent application 826,202. An Improved Controller Arm for a Remotely Related Slave Arm. Filed Aug. 19, 1977.

Patent application 826,204. An Improved Vehicular Impact Absorption System. Filed Aug. 19, 1977.

Patent application 829,314. A Seat Cushion to Provide Realistic Acceleration Cues for Aircraft Simulator Pilots. Filed Aug. 31, 1977.

Patent application 829,316. Apparatus for Assembling Space Structure. Filed Aug. 31, 1977.

Patent application 829,317. Intra-Ocular Pressure Normalization Technique and Equipment. Filed Aug. 31, 1977.

Patent application 829,318. Intra-Ocular Pressure Normalization Apparatus. Filed Aug. 31, 1977.

Patent application 831,633. Acoustically Swept Rotor. Filed Sept. 8, 1977.

Patent application 831,634. An Improved Free Wing for an Aircraft. Filed Sept. 8, 1977.

Patent 4,033,503. Method for Attaching a Fused-Quartz Mirror to a Conductive Metal Substrate. Filed Aug. 27, 1976. Patented July 5, 1977. Not available NTIS.

Patent 4,038,705. Rotational Joint Assembly for the Prosthetic Leg. Filed July 30, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,000. Accumulator. Filed Dec. 18, 1975. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,347. Method of Preparing Zinc Orthotitanate Pigment. Filed June 17, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,754. Speech Analyzer. Filed Apr. 9, 1975. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,925. Phase Substitution of Spare Converter for a Failed One of Parallel Phase Staggered Converters. Filed June 10, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,946. Tachometer. Filed Mar. 18, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,040,041. Twin-Capacitive Shaft Angle Encoder with Analog Output Signal. Filed Oct. 24, 1975. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,040,750. Real Time Reflectometer. Filed May 28, 1976. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,041,233. Aldehyde-Containing Urea-Absorbing Polysaccharides. Filed Mar. 15, 1976. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,041,391. Pseudo Noise Code and Data Transmission Method and Apparatus. Filed Dec. 30, 1975. Patented Aug. 9, 1977. Not available NTIS.

Patent 4,042,926. Automatic Transponder. Filed Mar. 27, 1975. Patented Aug. 16, 1977. Not available NTIS.

U.S. DEPARTMENT OF ENERGY

Asst. General Counsel for Patents, Washington, D.C. 20545

Patent 3,988,692. Nuclear Reactor for Breeding exp 233 U. Filed Dec. 8, 1975. Patented Dec. 21, 1976. Not available NTIS.

Patent 3,992,257. Neutron-Absorber Release Device. Filed Aug. 13, 1975. Patented Nov. 16, 1976. Not available. NTIS.

Patent 3,999,067. High Speed Radiation Scanning Technique for Simultaneously Determining the Pitch and Eccentricity of an Encased Coil. Filed Oct. 14, 1975. Patented Dec. 21, 1976. Not available NTIS.

Patent 4,006,034. Method of Preparing an Electrochemical Cell in Uncharged State. Filed Mar. 11, 1976. Patented Feb. 1, 1977. Not available NTIS.

Patent 4,008,899. Seal for Permitting Transfer of Tape from One Pressure Region to a Region of Substantially Different Pressure. Filed Jan. 27, 1976. Patented Feb. 22, 1977. Not available NTIS.

Patent 4,011,372. Method of Preparing a Negative Electrode Including Lithium Alloy for Use within a Secondary Electrochemical Cell. Filed Dec. 9, 1975. Patented Mar. 8, 1977. Not available NTIS.

Patent 4,011,373. Uncharged Positive Electrode Composition. Filed Apr. 29, 1976. Patented Mar. 8, 1977. Not available NTIS.

Patent 4,011,374. Porous Carbonaceous Electrode Structure and Method for Secondary Electrochemical Cell. Filed Dec. 2, 1975 Patented Mar. 8, 1977. Not available NTIS.

Patent 4,012,209. Liquid Film Target Impingement Scrubber. Filed Apr. 5, 1976. Patented Mar. 15, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302 Arlington, Va. 22217

Patent application 829,761: 2,3,7,8-Tetraazaspiro (4.4) nonane, 2,3,7,8-Tetraazaspiro-(4.4) nona-2,7-diene and Derivatives. Filed Sept. 1, 1977.

Patent application 830,241. Quick Disconnect Intercell Busbar for Deep Submergence Batteries. Filed Sept. 2, 1977.

Patent 4,012,492. Synthesis of Anhydrous Metal Perchlorates. Filed June 10, 1975. Patented Mar. 15, 1977. Not available NTIS.

Patent 4,017,687. Device for Minimizing Interchannel Crosstalk in High Rate Commutator Multiplexers. Filed Nov. 28, 1975. Patented Apr. 12, 1977. Not available NTIS.

Patent 4,032,885. Digital Correlator. Filed Mar. 1, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,032,922. Multibeam Adaptive Array. Filed Jan. 9, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,035,691. Pulsed Laser Excitation Source. Filed Aug. 4, 1975. Patented July 12, 1977. Not available NTIS.

Patent 4,037,147. Isolation Amplifier for Resistive and Inductive Loads. Filed Feb. 26, 1976. Patented July 19, 1977. Not available NTIS.

Patent 4,040,060. Notch Fed Magnetic Microstrip Dipole Antenna with Shorting Pins. Filed Nov. 10, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,041,580. Separable Link Connector. Filed Jan. 12, 1975. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,430. Temperature Resistant Explosive Containing Diaminotrinitrobenzene. Filed Apr. 10, 1972. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,441. Mechanical-Chemical Linkage between Polymer Layers. Filed May 6, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,449. Method of Making a Reticle-Lens. Filed Sept. 20, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,829. Frequency Domain Discrimination and Counting Technique. Filed Nov. 4, 1975. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,837. Short Pulse Solid State-Magnetic Modulator for Magnetron Transmitter. Filed Nov. 15, 1976. Patented Aug. 16, 1977. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assist. General Counsel for Patent Matters, NASA Code GP–2, Washington, D.C. 20546

Patent application 826,203. Process for Removing Sulfur Dioxide from Gas Streams. Filed Aug. 19, 1977.

Patent application 829,390. Aluminum or Copper Substrate Panel for Selective Absorption of Solar Energy and the Method of Producing Said Panel. Filed Aug. 31, 1977.

Patent application 830,382. Stainless Steel Panel for Selective Absorption of Solar Energy and the Method of Producing Said Panel. Filed Sept. 2, 1977.

Patent application 831,632. Reduction of Nitric Oxide Emissions from a Combustor. Filed Sept. 8, 1977.

Patent application 831,633. Acoustically Swept Rotor. Filed Sept. 8, 1977.

Patent application 831,634. An Improved Free Wing for an Aircraft. Filed Sept. 8, 1977.

Patent 4,039,000. Accumulator. Filed Dec. 18, 1975. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,039,489. Oil and Fat Absorbing Polymers. Filed Apr. 7, 1976. Patented Aug. 2, 1977. Not available NTIS.

Patent 4,041,910. Combustion Engine. Filed Apr. 2, 1975. Patented Aug. 16, 1977. Available NTIS.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents, Washington, D.C. 20545

Conf. 770,106. Public Colloquium on Mandatory Patent Licensing. Jan. 12, 1977. Not available NTIS.

U.S. DEPARTMENT OF TRANSPORTATION

Patent Counsel, 400 7th Street, S.W., Washington, D.C. 20590

Patent application 833,501. Vortex Advisory System. Filed Sept. 15, 1977.

U.S. DEPARTMENT OF ENERGY

Assistant General Counsel for Patents, Washington, D.C. 20545

Patent application 727,560. Isotope Separation. Filed Sept. 29, 1976.

Patent 4,004,890. Method and Means of Reducing Erosion of Components of Plasma Devices Exposed to Helium and Hydrogen Isotope Radiation. Filed Feb. 9, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,004,993. Electrolytic Trapping of Iodine from Process Gas Streams. Filed Feb. 26, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,178. Method for Converting UF sub 5 to UF sub 4 in a Molten Fluoride Salt. Filed July 10, 1975. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,005,289. Method for Identifying Anomalous Terrestrial Heat Flows. Filed Jan. 5, 1976. Patented Jan. 25, 1977. Not available NTIS.

Patent 4,008,411. Production of 14 Mev Neutrons by Heavy Ions. Filed July 8, 1975. Patented Feb. 15, 1977. Not available NTIS.

Patent 4,010,100. Isotope Separation by Photochromatography. Filed Oct. 3, 1975. Patented Mar. 1, 1977. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

National Institutes of Health, Chief, Patent Branch, Westwood Building, Bethesda, Md. 20014

Patent application 804,601. The Synthesis of 6-Amino-4-Methyl-8-(beta-D-Ribo-Furanosyl)Pyrrolo(4, 3, 2-DE)Pyrimido(4, 5-C)Pyridazine-5'-Phosphate as a Novel Compound and Its Utility Against L-1210 Mouse Leukemia. Filed June 8, 1977.

Patent application 806,317. Novel Vinblastine and Vincristine Compounds. Filed June 13, 1977.

Patent 4,035,150. Test for Occult Blood in an Emulsified Aqueous/Organic System. Filed July 7, 1976. Patented July 12, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE INTERIOR

Branch of Patents, 18th and C Streets, N.W., Washington, D.C. 20240

Patent 4,009,649. Mine Ventilation Control Device. Filed Apr. 2, 1976. Patented Mar. 1, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent 3,982,819. Fluid Gap Glan-Laser Prism. Filed May 22, 1975. Patented Sept. 28, 1976. Not available NTIS.

Patent 4,031,534. Noise Resistant Zone Penetration Detection System. Filed June 1, 1976. Patented June 21, 1977. Not available NTIS.

Patent 4,032,863. Metal Vapor Laser Tube. Filed Apr. 19, 1976. Patented June 28, 1977. Not available NTIS.

Patent 4,037,959. Means for Real-Time Laser Source Characterization. Filed Dec. 15, 1975. Patented July 26, 1977. Not available NTIS.

Patent 4,041,869. Cook-Off Liner Component. Filed July 15, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,041,871. Shock Buffer for Liquid Propellant Gun Projectile. Filed July 15, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,432. Desensitizer for N-Propyl Nitrate. Filed Dec. 13, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,892. Hypersonic Gas Laser. Filed July 22, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,042,904. Hydroways. Filed Sept. 1, 1976. Patented Aug. 16, 1977. Not available NTIS.

Patent 4,045,140. Means for Near Real Time C-W Laser Source Characterization. Filed Dec. 15, 1975. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,047,120. Transient Suppression Circuit for Push-Pull Switching Amplifiers. Filed July 15, 1976. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,048,048. Apparatus for Making a Memory Wire. Filed Apr. 7, 1976. Patented Sept. 13, 1977. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters, NASA Code GP–2, Washington, D.C. 20546

Patent application 744,576. Casium Thermionic Converters Having Lanthanum Hexaboride Electrodes. Filed Nov. 24, 1976.

Patent application 764,245. Bearing Material. Filed Jan. 31, 1977.

Patent application 829,315. Closed Loop Spray Cooling Apparatus. Filed Aug. 31, 1977.

Patent application 829,319. Magnetic Heat Pumping. Filed Aug. 31, 1977.

Patent application 833,636. Strong Thin Membrane Structure. Filed Sept. 15, 1977.

Patent application 833,637. Circuit for Automatic Load Sharing in Parallel Converter Modules. Filed Sept. 15, 1977.

Patent application 837,259. Compact Artificial Hand. Filed Sept. 27, 1977.

Patent application 837,796. Indicated Mean Effective Pressure Instrument (IMEP). Filed Sept. 29, 1977.

Patent application 796,263. Catalytic Trimerization of Aromatic Nitriles and Triayl-S-Triazine Ring Cross-Linked High Temperature Resistant Polymers and Copolymers Made Thereby. Filed May 12, 1977.

Patent 4,043,674. Spatial Filter for Q-Switched Lasers. Filed Oct. 2, 1974. Patented Aug. 23, 1977. Not available NTIS.

Patent 4,044,753. Solar Energy Collection System. Filed Apr. 28, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,044,821. Low to High Temperature Energy Conversion System. Filed Dec. 27, 1974. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,063. Load Regulating Latch. Filed Dec. 18, 1975. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,149. Platform for a Swing Root Turbomachinery Blade. Filed Feb. 3, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,247. Thermocouples of Tantalum and Rhenium Alloys for More Stable Vacuum-High Temperature Performance. Filed Nov. 6, 1975. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,255. Directionally Solidified Eutectic gamma Plus beta Nickel-Base Superalloys. Filed June 1, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,315. Solar Photolysis of Water. Filed Feb. 13, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,359. Apparatus for Photon Excited Catalysis. Filed Jan. 29, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,728. Direct Reading Inductance Meter. Filed Apr. 15, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,792. Analog to Digital Converter for Two-Dimensional Radiant Energy Array Computers. Filed Feb. 13, 1976. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,045,795. Charge-Coupled Device Data Processor for an Airborne Imaging Radar System. Filed June 23, 1975. Patented Aug. 30, 1977. Not available NTIS.

Patent 4,046,012. Fluid Sampling Device. Filed Nov. 19, 1976. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,190. Flat-Plate Heat Pipe. Filed May 22, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,262. Anthropomorphic Master/Slave Manipulator System. Filed Jan. 24, 1974. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,434. Deformable Bearing Seat. Filed July 14, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,435. Bearing Seat Usable in a Gas Turbine Engine. Filed July 14, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,462. Three-Dimensional Tracking Solar Energy Concentrator and Method for Making Same. Filed Apr. 28, 1976. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,529. Regenerable Device for Scrubbing Breathable Air of CO2 and Moisture Without Special Heat Exchanger Equipment. Filed May 21, 1976. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,560. Nickel Base Alloy. Filed Dec. 30, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,617. Method of Crystallization. Filed Sept. 5, 1975. Patented Sept. 6, 1977. Not available NTIS.

Patent 4,046,619. Method of Treating the Surface of a Glass Member. Filed May 3, 1976. Patented Sept. 6, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 832,708. Environmental Test Chamber System. Filed Sept. 12, 1977.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patent,
Washington, D.C. 20545

Patent 4,024,399. Method and Apparatus for Measuring Vapor Flow in Isotope Separation. Filed Jan. 6, 1975. Patented May 17, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research,
Code 302, Arlington, Va. 22217

Patent application 771,594. Digital To Graphic Character Generator. Filed Feb. 24, 1977.

Patent application 780,571. Dry Cooled Jet Aircraft Runup Noise Suppression System. Filed Mar. 23, 1977.

Patent application 809,599. Improved Aluminum Alloy for Primary Alkaline Fuel Cells and Batteries. Filed June 24, 1977.

Patent application 818,643. Diver Navigation System. Filed July 25, 1977.

Patent application 821,269. Optical Beam Steering System. Filed Aug. 3, 1977.

Patent application 825,007. Surface Passivation of IV-VI Semiconductors with As2S3. Filed Aug. 16, 1977.

Patent application 826,509. Pyrotechnic Separation Device. Filed Aug. 22, 1977.

Patent application 827,393. System for Transporting Wastewater by Vacuum. Filed Aug. 23, 1977.

Patent application 829,700. Square and Rectangular Electroacoustic Bender Bar Transducer. Filed Sept. 1, 1977.

Patent application 833,121. Breakaway Link Assembly for Maintaining a Structural Alignment of Shock-Sensitive Equipment. Filed Sept. 14, 1977.

Patent application 833,325. An Automated Flash-Bang Method and Apparatus for Determining Lighting Stroke Distances. Filed Sept. 14, 1977.

Patent application 833,798. Narrowband Infrared Detector. Filed Sept. 16, 1977.

Patent application 836,255. Pressure-Resistant Housing. Filed Sept. 23, 1977.

Patent application 836,265. Optical Logic Elements. Filed Sept. 26, 1977.

Patent application 840,703. Mean-Level Detector for Multiple Target Environments. Filed Oct. 18, 1977.

U.S. DEPARTMENT OF THE AIR FORCE
AF/JACP, Washington, D.C. 20314

Patent application 833,788. Boundary Layer Scoop for the Enhancement of Coanda Effect Flow Deflection over a Wing/Flap Surface. Filed Sept. 16, 1977.

Patent application 840,334. Potential Troughs for Charge Transfer Devices. Filed Oct. 7, 1977.

Patent application 840,353. RF Excited Mercury Laser Lamp. Filed Oct. 7, 1977.

U.S. DEPARTMENT OF ENERGY
Assistant General Counsel for Patents,
Washington, D.C. 20545

Patent 3,988,178. Method for Preparing Superconductors. Filed Nov. 29, 1974. Patented Oct. 26, 1976. Not available NTIS.

Patent 3,994,279. Solar Collector with Improved Thermal Concentration. Filed July 24, 1975. Patented Nov. 30, 1976. Not available NTIS.

Patent 3,995,485. Dry, Portable Calorimeter for Nondestructive Measurement of the Activity of Nuclear Fuel. Filed Oct. 20, 1975. Patented Dec. 7, 1976. Not available NTIS.

Patent 4,009,614. Apparatus for Monitoring Two-Phase Flow. Filed Dec. 19, 1975. Patented Mar. 1, 1977. Not available NTIS.

Patent 4,012,282. Multiple Lead Seal Assembly for a Liquid-Metal-Cooled Fast-Breeder Nuclear Reactor. Filed May 17, 1976. Patented Mar. 15, 1977. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research,
Code 302, Arlington, Va. 22217

Patent application 745,758. Stable Alkaline Zinc Electrode. Filed Nov. 29, 1976.

Patent application 822,475. Non-Linear Acoustic Transducer. Filed Aug. 8, 1977.

Patent application 828,809. Composite Video Signal Field Recognition Circuit. Filed Aug. 29, 1977.

Patent application 829,542. Optical Photoemissive Detector and Photomultiplier. Filed Aug. 31, 1977.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 11, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-11-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-1-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	7-20-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-6-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-7-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	12-10-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	8-9-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-28-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	7-5-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	5-6-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-28-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking: Tools; Cutlery; Jacks.	5-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	1-6-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	2-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-9-77

Expiration of patents: The patents within the range of numbers indicated below expire during February 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,970,313 to 2,973,518, inclusive
Plant Patents..... Numbers 2,019 to 2,031, inclusive

REISSUES

FEBRUARY 28, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,551

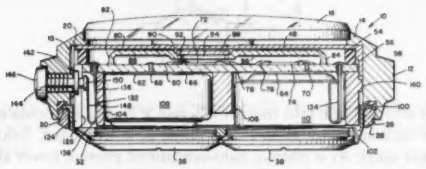
ELECTRONIC WATCH MOVEMENT MOUNTING AND CONNECTION

Rudolf F. Zurcher, and I. Benjamin Merles, both of Newport Beach, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Original No. 3,838,568, dated Oct. 1, 1974, Ser. No. 343,319, Mar. 21, 1973. Application for reissue Nov. 17, 1975, Ser. No. 632,612

Int. Cl.[2] G04B *37/00*

U.S. Cl. 58—88 C **23 Claims**



4. [The electronic watch of claim **1** wherein] *An electronic watch;*

said electronic watch having a case and a crystal mounted on the front of said case, said case having an axis extending through said crystal and normal to the body of said case;

a substrate within said case, an electronically controlled display device for digitally displaying the time signal of said electronic watch, said substrate carrying said display device;

said case having an opening therein below said crystal;

the improvement comprising:

said substrate being radially and axially smaller than said opening within said case so that said substrate can move with respect to said case, said substrate having a face, and a back, a first resilient body on the face of said substrate between said substrate and said case and a second resilient body between said substrate and said case on said back of said substrate for permitting axial motion of said substrate with respect to said case by resilient deflection of said resilient body, said second resilient body comprising a battery spring; said substrate [has] *also having* a plurality of *radially positioning* springs between said substrate and said case to radially urge said substrate to a central position with respect to said case.

Re. 29,552

MAGNETIC GAME STRUCTURE

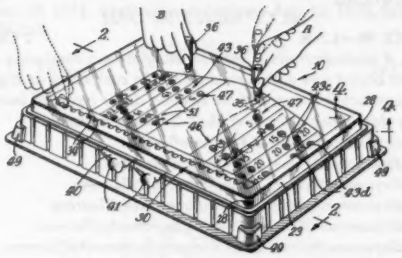
Douglas R. Bolton, Palatine, Ill., assignor to Cadaco, Inc., Chicago, Ill.

Original No. 3,734,502, dated May 22, 1973, Ser. No. 149,646, Jun. 3, 1971. Application for reissue Oct. 30, 1974, Ser. No. 519,127

Int. Cl.[2] A63B *71/02;* **A63F** *7/00*

U.S. Cl. 273—95 R **30 Claims**

1. A game structure comprising: a flat, transparent panel; means for peripherally supporting said panel to extend horizontally; a plurality of magnetizable playing pieces; support means for receiving and removably storing said magnetizable playing pieces closely subjacent said panel; magnetic means for manipulation superjacent said panel for attracting said pieces, said support means being disposed sufficiently close to said panel to permit said magnetic means to attract said playing pieces on said support means seriatim with said panel disposed therebetween, and permitting lateral movement of said pieces from said support means along the underside of the panel as a result of corresponding lateral movement of said magnetic means along the top side of the panel; and a plurality of upwardly opening cup elements disposed in a preselected arrangement spaced at different distances below said panel



adapted to catch a playing piece dropped respectively accurately into the center of the elements.

Re. 29,553

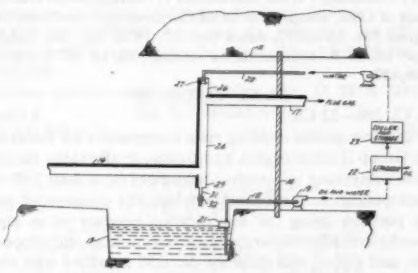
OIL SHALE RETORT FLUE GAS COOLING AND CLEANING

Robert S. Burton, III, Grand Junction, Colo., and Gordon B. French, Bakersfield, Calif., assignors to Occidental Oil Shale, Inc., Grand Junction, Colo.

Original No. 3,915,498, dated Oct. 28, 1975, Ser. No. 505,100, Sep. 11, 1974. Application for reissue Jul. 18, 1977, Ser. No. 816,798

Int. Cl.[2] E21C *41/10;* **E21B** *43/24*

U.S. Cl. 299—2 **7 Claims**



1. Apparatus for cleaning and cooling flue gas from an in situ oil shale retort comprising:

a tunnel at the bottom of the retort;

a sump in the floor of the tunnel for collecting oil and water from the retort;

a gas tight bulkhead in the tunnel beyond the sump for preventing escape of flue gas from the retort;

a conduit for collecting flue gas from the bottom of the retort having at least a vertical portion in the tunnel through which collected flue gas flows upwardly and a portion passing through the bulkhead for withdrawing flue gas from the retort;

a sparger [at the top of] *in* the vertical portion of the conduit for spraying water downwardly through the vertical portion countercurrent to the flue gas; and

means for draining the sparged water into the sump.

Re. 29,554
ORGANIC PHOTOCONDUCTIVE MEMBERS COMPRISING DICYANOMETHYLENE SUBSTITUTED FLUORENE SENSITIZERS

Evan S. Baltazzi, Brookfield, Ill., assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Original No. 37,526,688, dated Aug. 14, 1973, Ser. No. 830,879, Jun. 5, 1969. Continuation-in-part of Ser. No. 679,246, Oct. 30, 1967, abandoned. Application for reissue Apr. 1, 1976, Ser. No. 672,702

Int. Cl.² G03G *5/06, 13/22*

U.S. Cl. 96—1.5 R **2 Claims**

16. A photoelectrostatic member comprising a conductive base support coated with a photoconductive film comprising an organic photoconductive polymer of the electron donor type and incorporating therein one or more of the following sensitizers:

9-(dicyanomethylene)-2,4-dicyanofluorene
9-(dicyanomethylene)-2,4,7-tricyanofluorene
9-(dicyanomethylene)-2,4,5,7-tetracyanofluorene
9-(dicyanomethylene)-2,4-ditrifluoromethylfluorene
9-(dicyanomethylene)-2,4,7-tritrifluoromethylfluorene
9-(dicyanomethylene)-2,4,5,7-tetratrifluoromethylfluorene
9-(dicyanomethylene)-2,4-dimethylfluorene
9-(dicyanomethylene)-2,4,7-trimethylfluorene
9-(dicyanomethylene)-2,4,5,7-tetramethylfluorene
9-(dicyanomethylene)-2,4-dibutoxyfluorene
9-(dicyanomethylene)-2,4,7-tributoxyfluorene
9-(dicyanomethylene)-2,4,5,7-tetrabutoxyfluorene
9-(dicyanomethylene)-2,4-dichlorofluorene
9-(dicyanomethylene)-2,4,7-trichloro-fluorene
9-(dicyanomethylene)-2,4,5,7-tetrachloro-fluorene.

Re. 29,555
LOW SHRINK THERMOSETTING POLYESTERS

John L. Canning, Parma, and Robert W. Lottig, North Olmsted, both of Ohio, assignors to SCM Corporation, New York, N.Y.

Original No. 3,986,992, dated Oct. 19, 1976, Ser. No. 568,591, Apr. 16, 1975. Application for reissue Feb. 14, 1977, Ser. No. 768,439

Int. Cl.² C08L *67/08*

U.S. Cl. 260—22 CB **4 Claims**

1. In a low-profile molding resin composition for thickening with Group II metal oxides, hydroxides, or alkoxides, the resin system comprising by weight a mixture of (a) at least 25% of a dicyclopentadiene terminated ethylenically unsaturated polyester polymer being the esterification product of an alpha, beta-ethylenically unsaturated dicarboxylic acid, dicyclopentadiene, and glycol, said dicarboxylic acid esterified with about 0.1 to 0.4 moles of dicyclopentadiene per mole of dicarboxylic acid, said polyester produced by first reacting a molar excess of said dicarboxylic acid with said glycol to produce an acid terminated prepolymer and then reacting the dicyclopentadiene with said prepolymer, (b) about 5% to 20% of an acid functional thermoplastic polymer, and (c) about 30% to 60% of an ethylenically unsaturated monomer, the improvement comprising:

said thermoplastic polymer being a fatty acid modified branched, thermoplastic alkyd condensation polymer, said alkyl being the esterification product of glycol and minor amounts of polyol preferentially esterified with linear saturated dicarboxylic acids having between about 4 to 10 carbon atoms and monocarboxylic fatty acid, said alkyl containing between about 4% to 20% of said fatty acid by weight and having a hydroxyl equivalent branching functionality of between about 2.02 and 2.2.

Re. 29,556
1,1-DIARYL-1-OXADIAZOL-ALKYLAMINES

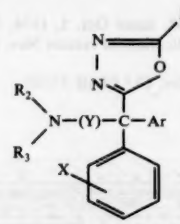
Gilbert W. Adelstein, Evanston, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Original No. 3,917,615, dated Nov. 4, 1975, Ser. No. 456,755, Apr. 1, 1974. Application for reissue Sep. 2, 1976, Ser. No. 719,775

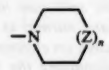
Int. Cl.² C07D *413/10*

U.S. Cl. 260—293.54 **15 Claims**

1. A compound of the formula



and acid addition salts thereof wherein Y is alkylene containing 1–4 carbon atoms; R_1 is lower alkyl; X is hydrogen, halo or lower alkyl; Ar is phenyl, halo-substituted phenyl, lower alkyl substituted phenyl, or 2-pyridyl; and [R_2 and R_3 are lower alkyl, or] R_2 and R_3 together with N is a heterocyclic ring system consisting of azamonocyclic ring of the formula



wherein n is 0 or 1 and Z is oxygen, methylene, phenylhydroxymethylene, phenylcarboxymethylene, phenylcarbloweralkoxymethylene or azabicycloalkane containing 6 to 9 carbon atoms and containing at least 5 atoms in each ring of the azabicycloalkane.

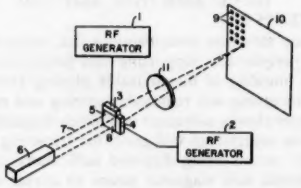
Re. 29,557
Tl_3PSe_4 COMPOUND, SINGLE CRYSTALS, AND ACOUSTO-OPTICAL DEVICES

Thelma J. Isaacs, Murrysville; Milton S. Gottlieb, Pittsburgh; John D. Feichtner, Murrysville, and Andrea A. Price, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Original No. 3,929,970, dated Dec. 30, 1975, Ser. No. 392,693, Aug. 29, 1973. Application for reissue Aug. 3, 1976, Ser. No. 711,020

Int. Cl.² C01B *25/00*

U.S. Cl. 423—299 **7 Claims**



1. A compound having the general formula Tl_3XSe_4 where X is about 50 to about 100% phosphorus and about 0 to about 50% arsenic.

Re. 29,558
LINCOMYCIN ANALOGS

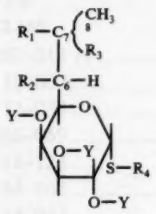
Brian Bannister, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Original No. 3,870,699, dated Mar. 11, 1975, Ser. No. 338,459, Mar. 6, 1973. Application for reissue Oct. 8, 1976, Ser. No. 730,835

Int. Cl.[2] C07H *15/16*

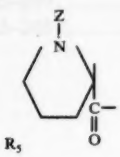
U.S. Cl. 536—11 **21 Claims**

1. A compound of the formula:

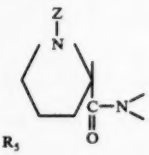


wherein R_1 when taken independently represents hydrogen; R_2 when takene independently represents the monovalent moiety

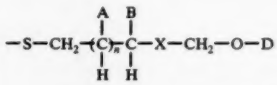
wherein Ac is selected from carboxyacyl of from 2 to 18 carbon atoms, inclusive, and an acyl radical of formula:



wherein Z is selected from hydrogen, lower alkyl and an amino protecting group removable by hydrogenolysis; R_5 is lower alkyl; R_1 and R_2 when taken together form the divalent group of the formula:



wherein Z and R_5 are as defined above; R_3 is hydrogen when R_1 and R_2 are taken together and when R_1 and R_2 are taken independently, R_3 is a monovalent thio group in the 7(S)-position, having the formula:



wherein A is selected from hydrogen and hydroxy, B is selected from hydrogen and monohydroxyloweralkyl, n is the integer 0 when B is monohydroxyloweralkyl and an integer of from 0 to 1 when B is hydrogen, X is [selected from] oxygen [and sulfur], D is an acyl radical of a lower hydrocarbon carboxylic acid; R_4 represents lower alkyl; and Y is selected from carboxacyl of from 2 to 18 carbon atoms, inclusive, and hydrogen.

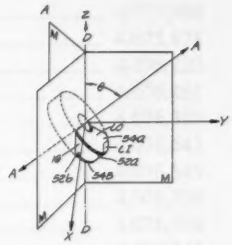
Re. 29,559
COMPRESSION ACCELEROMETER UTILIZING A LITHIUM NIOBATE PIEZOELECTRIC CRYSTAL

Howard C. Epstein, Arcadia, Calif., assignor to Becton, Dickinson Electronics Company, San Juan Capistrano, Calif.

Original No. 3,714,476, dated Jan. 30, 1973, Ser. No. 111,051, Jan. 29, 1971. Application for reissue Jan. 16, 1974, Ser. No. 433,715

Int. Cl.[2] H01L *41/18*

U.S. Cl. 310—360 **20 Claims**



9. In a piezoelectric device including at least one transducer element comprising a piezoelectric crystal, the improvement according to which said piezoelectric crystal is cut from a larger crystal of lithium niobate, said crystal having a crystal orientation selected from the following:

(yxl) +38.6° (±1°), (zxtl) +60° (±1°)/+51.4° (±1°),

or a symmetrical equivalent thereof.

Re. 29,560
PEAK LOAD LEVELLING SYSTEM

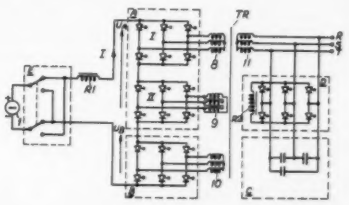
Kjell Frank, and Kjeld Thorborg, both of Vasteras, Sweden, assignors to ASEA Aktiebolag, Vasteras, Sweden

Original No. 3,932,799, dated Jan. 13, 1976, Ser. No. 515,358, Oct. 16, 1974. Application for reissue May 17, 1976, Ser. No. 686,898

Claims priority, application Sweden, Oct. 23, 1973, 7314350

Int. Cl.[2] H02M *7/00*

U.S. Cl. 363—71 **4 Claims**



1. Load levelling system for connection to an alternating current network (RST), said system comprising electrochemical direct current energy supply means (1), line-commutated controllable electronic power convertor means (A, B) having DC terminals connected to said energy supply means and AC terminals for connection to said AC network, and continuously controllable reactive power generating means (C, D) connected to said AC terminals, said reactive power generating means comprising a fixed capacitor battery (C) and a line-commutated reactive power convertor (D), [the convertor means comprising a first (A) and a second (B) line-commutated thyristor convertor connection, each convertor connection hav-

ing DC and AC terminals, said convertor connection being series-connected through their DC terminals and having transformer means (TR) connecting their AC terminals, said first convertor connection (A) having a higher rated voltage than the second convertor connection (B), means for setting the control angle of said first convertor connection (A) to either one of two substantially fixed values, corresponding to full direct voltage in rectifying and in inverting operation, respectively, and means for controlling said second convertor connection (B) with a variable control angle], *said system including means for connecting the DC terminals of said reactive power convertor (D) to the energy supply means for supplying power to or from said energy supply means in parallel with said controllable electronic power convertor means (A, B).*

PATENTS

GRANTED FEBRUARY 28, 1978

ERRATA

For CLASS	See PATENT NO.
260–018 N	4,075,830
118–007	4,075,968
112–033	4,075,978
366–069	4,076,220
418–123	4,076,261
354–165	4,076,395
156–053	4,076,543
423–544	4,076,545
544–048	4,076,709
424–267	4,076,714
423–328	4,076,842
536–059	4,076,918
542–447	4,076,940
526–062	4,076,951
362–104	4,076,976
365–049	4,077,029
365–205	4,077,031

PATENTS

GRANTED FEBRUARY 28, 1978

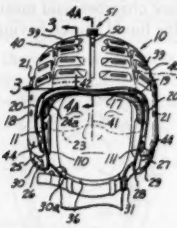
NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,075,714
HELMET CHARACTERIZED BY NEGATIVE LIFT

James H. Ryder, Sierra Madre; David C. Brown, Pasadena, and Johannes A. Van Haastert, Temple City, all of Calif., assignors to Sierra Engineering Co., Sierra Madre, Calif.

Filed Nov. 15, 1976, Ser. No. 742,007
Int. Cl.[2] A42B 3/00
U.S. Cl. 2—6 15 Claims



1. In a helmet adapted for use in aircraft and during ejection therefrom, said helmet being of the type having a shell covers the wearer's head, a visor housing spaced from and covering, an upper part of the shell, a visor retractable within the space between the shell and the visor housing and strap means for securing the helmet to the head of a wearer:

ridge means extending laterally and protruding upwardly at the top of the visor housing;

whereby when a wearer is ejected from an aircraft moving through the air there is created a disruption of the flow of air over the top of the helmet, resulting in reduction of the lift which would otherwise occur.

4,075,715
HELMET HAVING ANTI-LIFT DEVICE

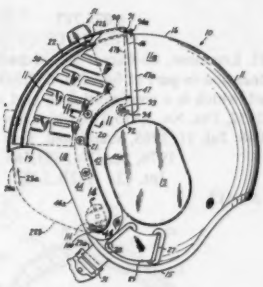
Duane W. Cowgill, Altadena, Calif., assignor to Sierra Engineering Co., Sierra Madre, Calif.

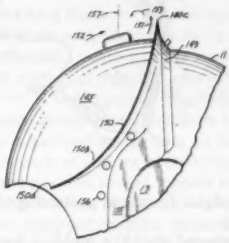
Filed Nov. 15, 1976, Ser. No. 742,006
Int. Cl.[2] A42B 3/00
U.S. Cl. 2—6 4 Claims

1. In a helmet adapted for use in aircraft and during ejection therefrom, said helmet being of the type having a shell which covers the wearer's head, a visor housing spaced from, and covering, an upper part of the shell, a visor retractable within the space between the shell and the visor housing and strap means for securing the helmet to the head of a wearer:

an anti-lift device attached at the upper surface of said visor housing, said anti-lift device comprising a flange outstanding from the visor housing and extending from a position near a forward side edge of the visor housing at the forehead area of the wearer and passing around the top crown area to a position near the forward side edge of the visor housing at the opposite side of the wearer's forehead said flange rising from a lowest elevation near said forward side edges to a highest elevation at the top crown area and having two opposite surfaces a first of which faces and receives wind blast during ejection and the second of which faces away from the wind blast,

the regions at and adjacent said forward side edges constituting wings positioned at a negative angle of attack against the wind blast, thus producing negative lift, and





the region at and adjacent the top crown area constituting a spoiler producing turbulence which disrupts skin effect at the region of the top crown area, thus spoiling upward lift.

4,075,716
DISPOSABLE GARMENT WITH RETAINED BELT ASSEMBLY

Robert F. Collins, Barrington, Ill., assignor to The Kendall Company, Boston, Mass.

Continuation-in-part of Ser. No. 542,999, Jan. 22, 1975, Pat. No. 3,987,518. This application May 6, 1976, Ser. No. 683,989
Int. Cl.[2] A41B 9/00
U.S. Cl. 2—114 18 Claims

1. A disposable garment, comprising:

a sterile gown having a back, a pair of side edges defining an opening on the back of the gown;

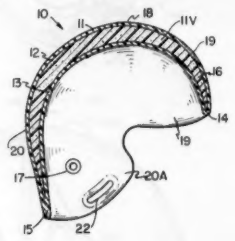
an elongated belt having at least one end section for placement around said opening to close the gown about a wearer;

means for bonding a mid-portion of the belt on an outer surface of the gown in close proximity to one of said side edges;

a protective member removably positioned on and covering an outer end of said one end section to prevent contamination of the one end section while handling the belt; and

means for releasably attaching the protective member against the garment adjacent said one side edge and preventing premature movement of the protective member relative the gown, said attaching means being separate from the bonding means and directly connecting an outer surface of the protective member against a surface of the garment.

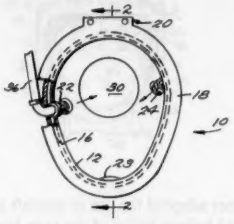
4,075,717
HELMATE
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840
Continuation-in-part of Ser. No. 553,914, Feb. 28, 1975, abandoned, which is a continuation-in-part of Ser. No. 300,248, Oct. 24, 1972, Pat. No. 3,875,275, which is a continuation of Ser. No. 744,048, Jul. 11, 1968, abandoned. This application Jan. 22, 1976, Ser. No. 651,566
Int. Cl.[2] A42B *3/02*
U.S. Cl. 2—412 **9 Claims**

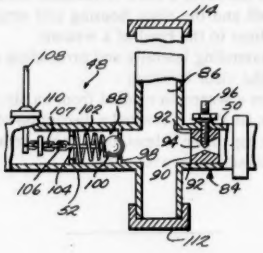


1. A headgear for use in protecting the head of the wearer comprising:
a bowl-shaped shell-like molding formed of a plurality of layers of plastic materials including:
a first outer layer defining a relatively hard outer shell,
a second layer of cellular plastic disposed within said outer layer and supporting same,
a third layer of non-cellular plastic abutting the inside surface of said second layer and peripherally joined by molding to the peripheral portions of said first layer so as to form an enclosure for said cellular plastic with said first layer,
said third layer being shaped to substantially conform to the shape of the skull of the wearer and defining a unitary molded structure with said first and second layers, and
said first and third layers being formed of a unitary hollow plastic molding containing an interior volume enclosed by said first and third layers, said second layer being formed of a self expanding plastic resin which is molded in-situ within said volume enclosed within said hollow molding.

4,075,718
NOZZLE FLUSH SYSTEM
William J. Hargraves, 515 S. Paula Drive, Dunedin, Fla. 33528
Filed Apr. 3, 1975, Ser. No. 564,896
Int. Cl.[2] E03D *11/00, 5/10;* **B67D** *5/54*
U.S. Cl. 4—300 **5 Claims**

1. Apparatus for flushing a toilet bowl of the type having a substantially horizontally disposed rim, a drain outlet located vertically below said rim and a smooth interior surface between said rim and drain outlet, said apparatus comprising in combination: liquid nozzle means having an inlet and an outlet, said nozzle means being disposed adjacent the rim of said bowl so that liquid discharged from said nozzle means will impinge upon all portions of the interior surface of said bowl, manually operable liquid flow control means including an outlet, conduit means for connecting said control means outlet to said inlet of said nozzle means, said flow control means having a flow passage of predetermined cross-sectional area and valve means for closing said flow passage, said valve means being manually movable to open said flow passage and movable to close said flow passage in response to a drop in pressure in said flow passage, said control means including a pressure chamber, an inlet connecting said pressure chamber to a source of liquid under pressure, and means for restricting the flow of liquid from the source to said pressure chamber so that, when said valve means is moved to open said flow passage, a predetermined quantity of liquid will discharge from said pressure chamber to said nozzle means causing a pressure drop sufficient to result in the closing of said flow passage by said valve means before pressure in said pressure chamber is restored by flow from the liquid source, said means for restricting the flow of liquid from the liquid source to said pressure chamber comprises an inlet orifice having one side communicating directly with said liquid source and its other side communicating directly with said pressure chamber, said means connecting said pressure chamber to the liquid source having a predetermined





cross-sectional area and said pressure chamber having a predetermined cross-sectional area, said inlet orifice having a cross-sectional area that is substantially dimensionally smaller than said predetermined cross-sectional areas of said pressure chamber and said means connecting said pressure chamber to the liquid source, said inlet orifice including means for adjusting the cross-sectional area thereof to vary the rate of liquid flow therethrough, said pressure chamber having a vertical axis, an upper end portion and a lower end portion, said means connecting said pressure chamber to a source of liquid under pressure comprising an inlet located between said upper and lower end portions, and said inlet of said flush valve being connected to said lower end portion of said pressure chamber so that, when said pressure chamber is filling with liquid, any atmospheric gases in said pressure chamber will be compressed in said upper end portion thereof to a pressure substantially equal to the pressure of said liquid source.

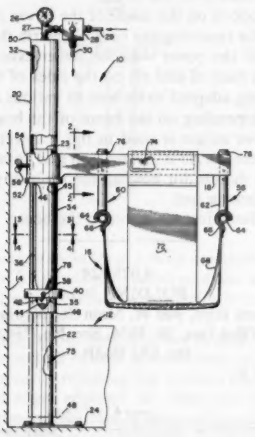
4,075,719
CHAIR LIFT APPARATUS
Lawrence J. Sullivan, 2688 E. 25th St., Odessa, Tex. 79761
Filed Sep. 1, 1976, Ser. No. 719,619
Int. Cl.[2] A47B *83/04;* **A47K** *3/12*
U.S. Cl. 5—81 R **14 Claims**

1. Lift apparatus by which wheelchair invalids are lifted from one location, through a spiral of several degrees, and to a second location, comprising:

a stationary vertical support member, a movable vertical support member, said stationary member being telescopingly received within said movable member to form a concentrically arranged coacting piston and a cylinder; means by which one of said members is received in sealed relationship within the other to provide a variable chamber which effects reciprocatory motion therebetween when fluid is forced to flow into and out of said variable chamber;

cam means jointly connected to said stationary and movable members for causing relative axial rotation therebetween when said members are reciprocated;

said cam means includes two parallel, radially spaced slots cut longitudinally through the wall of said movable member, with the slots each commencing at a medial part of the movable member and extending down toward one marginal end thereof where the slots converge together to form a camway in the form of a continuous slot, thereby leaving an elongated tab between the slots, said tab having a free end and a connected end;



a bridge connected to said free end of said tab and two radially spaced locations on the lower marginal end of said movable member to thereby rigidify the free end of the tab; a switch means pivotally affixed to the connection effected at said tab, a cam follower connected to said fixed member and received within said camway;

said switch means being positioned to engage said cam follower and force the follower to be changed from one to the other of said two spaced slots when one support member reciprocates within the other;

a cantilever arm having opposed ends, one end being in the form of a boss which is slidably received about said movable member, lock means by which said cantilever arm is secured to said movable member;

chair engaging assemblies connected to said cantilever arm for releasably engaging a chair; and,

a control valve means flow connected to said variable chamber, and adapted to be connected to a source of pressure and to a discharge, so that said control valve means can be actuated to connect the source of pressure or the discharge to the variable chamber, thereby reciprocating the fixed and movable members respective to one another.

4,075,720

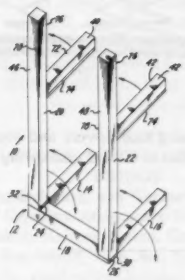
SUPPORT FRAMES ADAPTED FOR USE WITH CAR SEATS AND BEDS

Henry Fleischer, 18 Notch Park Road, Little Falls, N.J. 07424

Filed Jan. 12, 1977, Ser. No. 758,846

Int. Cl.[2] A47D *7/04*

U.S. Cl. 5—94 **13 Claims**



1. A universal-type locking frame for supporting or limiting movement of a car bed or car seat, said frame being adapted to be employed in an automobile, comprising, in combination, a support base, at least a portion of which is adapted to extend under an automobile seat, at least a pair of longitudinal spaced apart members, the space between said members being sufficiently large to allow a car bed or car seat to be disposed between said members, each of said members being pivotally connected at their lower portions to said support base so that said longitudinal members extend up from said support base and are adapted to be deployed in close proximity to and extending above the bench portion of an automobile seat in their use position and pivoted downwardly to a folded position substantially transverse to the fore and aft direction of the automobile, and a pair of normally horizontally disposed arm members, an arm member being pivotally connected to each of the longitudinal members, said arm members in their working position being disposed above said support base and extending out from the longitudinal members over the bench portion of an automobile seat for supporting or restricting movement of a car bed or car seat deployed on said automobile seat, whereby a car bed or car seat may be positioned on the automobile seat in a manner such that the car bed or car seat extends between and through the space between the longitudinal members so that the longitudinal members and horizontally disposed arm members in conjunction with the backrest portion of the automobile seat may limit movement of the car bed or car seat from side to side and/or front to back and means for holding said longitudinal members in their use position.

4,075,721

MATTRESS CONSTRUCTION AND METHOD OF MAKING

William L. Autrey, 13612 Carroll Way, Tustin, Calif. 92680, assignor to William L. Autrey, Tustin, Calif.

Division of Ser. No. 638,564, Dec. 8, 1975, Pat. No. 4,019,451. This application Apr. 25, 1977, Ser. No. 790,518

Int. Cl.[2] A47C *23/00*

U.S. Cl. 5—345 R **2 Claims**

1. A compact, unitary mattress construction comprising:

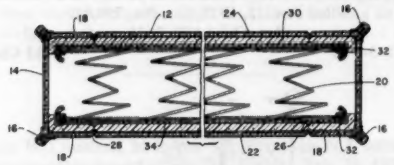
a coil spring assembly;

a pair of covers attached to said spring with a flange material stitched to said cover to provide a wide flange;

a thick foam pad between the cover and the flange material, the thickness of said pad producing a deep channel stitch when the flange material is sewn to the cover; and

a side cover stitched to said pair of covers around the periph-

ery of said wide flange with a binding tape to produce a unitary squared construction;



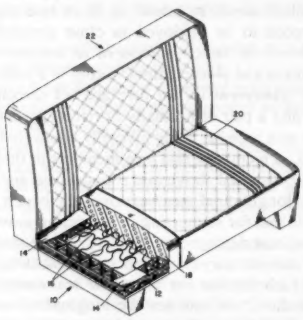
said wide flange causing said covers and foam pads to be stretched laterally flat over said coil spring assembly.

4,075,722

SPACE FRAME SEAT ASSEMBLY

James Franklin Rinard, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 27, 1976, Ser. No. 754,374
Int. Cl.² A47C *23/00*
U.S. Cl. 5—351 **10 Claims**



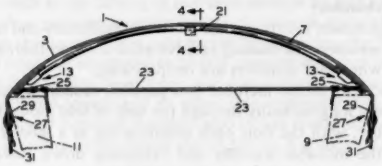
1. A unitary space frame suitable for forming in a simple two peice mold having a direction of mold opening travel, said frame comprising a plurality of cells, each cell comprising:
- an upper and a lower grid composed of grid members, said upper grid being offset from said lower grid in plan, said plan being defined by a lateral and longitudinal direction;
- a plurality of first connecting members, each inter-connecting a grid member in said upper grid and a grid member in said lower grid that are angularly askew, said first connecting members being oriented parallel to the direction of mold opening travel;
- a pair of side "Z" shaped member means interconnecting said upper grid to said lower grid to resist shear movement of said upper and lower grids in the longitudinal direction; and
- a center diagonal "V" shaped member means connecting said upper grid and said lower grid to resist shear movement in the lateral direction, the surfaces of said pair of side "Z" shaped member means and said "V" shaped member means being entirely exposed along the direction of mold opening travel for molding through either said upper or said lower grid.

4,075,723

BOAT COVER MEANS

Marvin A. Bareis, New Haven, Mo., and George C. Nisbet, Mount Prospect, Ill., assignors to Kellwood Company, St. Louis, Mo.

Filed Sep. 20, 1976, Ser. No. 724,711
Int. Cl.² B63B *17/02*
U.S. Cl. 9—1.5 **7 Claims**



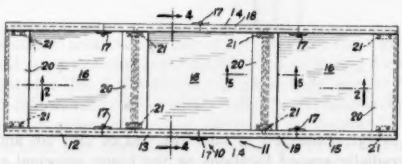
1. Boat cover means comprising:
- a cover of flexible sheet material;
- a flexible resilient rib constituting a cover support adapted to extend in arched configuration over a boat from adjacent one gunwale of the boat to the other for supporting the cover arched over the boat;
- a pair of pockets on the inside of the cover at opposite sides thereof for receiving the ends of the rib thereby to secure said rib to the cover with the cover extending down beyond the ends of said rib on the sides of the boat;
- said rib being adapted to be bent to various arched configurations depending on the beam of the boat on which the boat cover means is used in the transverse plane of the boat where the rib is located and said cover having means attached thereto for holding the rib in any of said arched configurations; and
- means for fastening the cover to the boat.

4,075,724

FOLDING BOAT

William Russell Hire, 940 W. Main St., Newark, Ohio 43055

Filed Dec. 28, 1976, Ser. No. 754,947
Int. Cl.² B63B *7/04*
U.S. Cl. 9—2 F **15 Claims**



1. A folded boat comprising,
- in combination, a foldable frame made of a plurality of sections and a plurality of open-topped containers,
- said frame comprising laterally-spaced side rails and a plurality of lateral members extending generally perpendicular to said side rails,
- each said side rail comprising a plurality of rail members hingedly connected together,
- each said side rail having an upwardly facing shoulder formed thereon,
- each said container comprising a bottom, side walls and end walls,
- each said side wall of said container terminating in a laterally-extending flange extending generally perpendicular to said side walls,
- said longitudinally-extending flanges being integrally attached to each said container and extending generally perpendicular thereto,
- a second hinge means on each lateral member whereby said lateral members are hingedly connected to said side rails,

said second hinge means being swingably connected to said side rails,

said second hinge means being swingably connected about an axis generally perpendicular to the axis of said first mentioned hinge means whereby said side rails may be swung to underlie said lateral members and said side rails can then be swung toward each other,

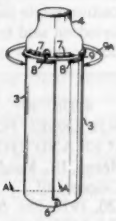
said shoulder being disposed substantially in a common plane when said side rails are in extended position whereby said shoulders may support said flanges of said containers.

4,075,725

SONOBUOY CASING

John Mar, Ottawa; Todd Garrett, Dartmouth, and Petrus Jacques, Ottawa, all of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed May 24, 1976, Ser. No. 689,492
Claims priority, application Canada, Jun. 3, 1975, 228305
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8 R 6 Claims



1. In a sonobuoy, a cylindrical casing comprising

a. a plurality of longitudinal cylinder sections which meet at longitudinal edges extending upwardly from the bottom end of the cylinder,

b. means hinging the sections together at each of said edges adjacent the bottom thereof at the bottom of the cylinder,

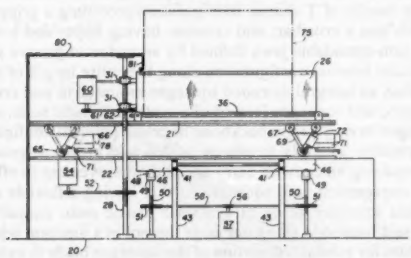
c. means temporarily retaining the sections together at each of the other edges adjacent the other end of the casing, whereby upon release of said other edges, the bottom of each of the cylindrical sections can swing below the bottom and clear of the cylinder.

4,075,726

METHOD AND APPARATUS FOR BINDING A BOOK

Jens Korsgaard, 8650 Boulevard East, North Bergen, N.J. 07047

Filed Jan. 20, 1976, Ser. No. 649,541
Int. Cl.[2] B42C *19/00, 11/00*
U.S. Cl. 11—1 R 9 Claims



1. A book binding apparatus comprising means for determining the thickness of a book to be bound comprising clamping means for holding said book, means for grooving a cover to be bound to said book comprising a pair of parallel groove bars mounted to engage one side of said cover and a backup roll mounted to engage the other side of said cover, and means responsive to said thickness determining means for spacing said groove bars apart a distance dependent upon the thickness of said book, and a glue-applying means mounted for movement with said roll, said glue-applying means comprising glue tube movable across said cover transversely of the direction of movement of said roll, means responsive to said thickness determining means for limiting the transverse movement of said glue tube, and positive displacement pump means for directing glue through said glue tube.

4,075,727

FRAME STRUCTURE, ESPECIALLY FOR A PORTABLE BRIDGE

Hugo Sedlacek, Duisburg, and Gerhard Sedlacek, Kamp-Lintfort, both of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sep. 8, 1976, Ser. No. 721,405
Claims priority, application Germany, Sep. 10, 1975, 2540267
Int. Cl.[2] F01D *19/00*
U.S. Cl. 14—14 13 Claims

2. A framework especially for a portable bridge, which includes: at least two supporting members arranged in spaced relationship to and one above the other, first and second coupling means respectively connected to said at least two supporting members, strut means detachably interconnecting said at least two supporting members, one portion of said strut means being operable so as to positively engage one of said coupling means to permit the latter to transmit forces in all directions, and the other one of said coupling means being operable when said one coupling means is in positive engagement with said one portion of said strut means to prevent said strut means from disengaging said one coupling means, said one portion of said strut means being provided with a bead and opposite said bead and in spaced relationship thereto has a surface section, said one coupling means comprising at least two elevations, one of which is hook-shaped for coupling engagement with said bead and forms therewith a swivel joint whereas the other elevation is arranged and designed for engagement with said surface section when said hook-shaped elevation is in coupling engagement with said bead.

4,075,728

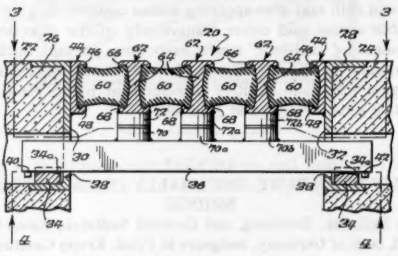
ADJUSTABLE EMBOSSMENT CONNECTOR FOR A COMPOSITE EXPANSION JOINT ASSEMBLY

Guy S. Puccio, Lancaster, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,129
Int. Cl.[2] E01D *19/06*
U.S. Cl. 14—16.5 19 Claims

1. In a composite expansion joint assembly for a bridge and the like, said assembly having a pair of edge members adapted to define the opposite sides of an expansion groove between bridge sections, said edge members having oppositely directed elongated openings extending lengthwise of said groove, laterally spaced support bars extending transversely of said groove with the opposite ends of said bars extending through said openings beyond the opposite side of said groove, a plurality of elongated resiliently yieldable sealing elements in a side-by-side relation extending longitudinally of said groove, at least one elongated rigid structural member interposed between said

sealing elements and extending lengthwise thereof, said structural member being supported above and mounted to at least one of said support bars; means for mounting said structural member to said support bar, said mounting means comprising swivel connector means disposed between said structural



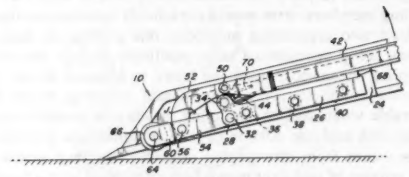
member and said support bar for operatively restraining said structural member against any substantial vertical or translational movement relative to said support bar while allowing at least limited relative rotational movement between said support bar and said structural member about said swivel connector.

4,075,729

LIFTING MECHANISM FOR A PORTABLE DOCKBOARD

John R. Conner, 3003 Bluffwood Terrace, St. Joseph, Mich. 49085

Filed Feb. 14, 1977, Ser. No. 768,694
Int. Cl.[2] E01D *15/00*
U.S. Cl. 14—72.5 **7 Claims**



5. A lifting mechanism for raising and temporarily supporting a heavy rectangular portable dockboard structure or the like to enable the forks of a lifting truck to move under the dockboard, said dockboard including a rectangular substantially planar plate means having a surface for bridging the gap between the edge of a horizontal floor of a loading dock and the bed of a vehicle, said plate means also having integral side rails extending above its surface, comprising

a. means mounted adjacent at least one corner of said dockboard, said means including

(i) first pivot bearing means integral with said dockboard,

(ii) an elongated bracket movable between an inactive position above said floor and an active position below said plate, said movable bracket being supported on said first pivot bearing means at a pivot connection to be moved from one of said positions to the other, said bracket being adapted in said active position to hold said at least one corner of said dockboard in a raised position,

(iii) a support means to carry said first pivot bearing means on the outside of at least one of said side rails,

(iv) a second pivot bearing means on the support means on the outside of said at least one side rail, said second pivot bearing means being spaced above said first pivot bearing means,

(v) a third pivot bearing means centrally disposed on the elongated bracket;

b. means to move said bracket from said inactive position to said active position including

(i) an elongated handle, said handle having two rotary bearing means integral with one end thereof, the first of said rotary bearing means of the handle being adapted to be mounted on said second pivot bearing means;

(ii) an L-shaped arm having connecting bearing means at each end thereof, one of said connecting bearing means of the L-shaped arm being connected to the second of said rotary bearing means on the handle and said other connecting bearing means at the other end of the L-shaped arm being connected to the third pivot bearing means;

said bracket, L-shaped arm and handle together with their bearing means being so proportioned and positioned as to allow the bracket to be substantially aligned with the surface of the plate means and above the floor of the dock when said bracket is in the inactive position and so as to allow the handle to be substantially parallel to the plane of the surface of the plate means when said bracket is in the inactive position; and said pivotally joined elements including said L-shaped arm forming a system providing a leverage means rotatable around said second pivot bearing means to drive said bracket into an over-the-center active position and lock the bracket against a return to the inactive position while said at least one corner of said dockboard is supported on said bracket;

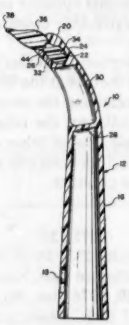
c. means to return said bracket to said inactive position.

4,075,730

NON-METALLIC SQUEEGEE FOR SHOWERBATH SURFACES AND THE LIKE

Herbert A. Siemund, Chicago, Ill., assignor to Greenview Manufacturing Company, Chicago, Ill.

Filed Sep. 20, 1976, Ser. No. 724,607
Int. Cl.[2] A47L *1/08, 13/11*
U.S. Cl. 15—245 **3 Claims**



1. A squeegee construction comprising a relatively rigid plastic handle of T-shaped configuration providing a gripping portion and a crossbar, said crossbar having upper and lower rigid non-spreadable jaws defined by an undercut groove of a particular internal configuration along the entire length of said crossbar, an integral extruded squeegee mounted in said crossbar jaws, said squeegee formed of a synthetic plastic resin, said squeegee having a rigid backbone of cross-sectional configuration capable matingly to engage within said undercut groove but requiring an endwise entry and sliding movement to effect such engagement, said squeegee further having a flexible and resilient squeegee blade of synthetic plastic resin connected with said backbone along one edge thereof at a junction which provides for substantial portion of the squeegee blade to extend laterally of an be free to flex relative to the crossbar, said squeegee blade being of a durometer hardness which is substantially different from the durometer hardness of the backbone part such that said squeegee blade is elastomeric in char-

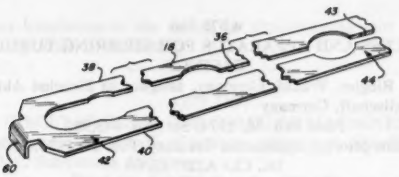
acter, the length of said squeegee blade and backbone being substantially greater than the length of the crossbar jaws, the squeegee extending beyond the ends of the jaws, the backbone supporting the squeegee blade sections extending beyond the crossbar, and means on the crossbar and backbone preventing endwise disengagement of the squeegee.

4,075,731

WINDSHIELD WIPER REFILL UNIT

William H. Harbison, Merrillville; Michael G. Mohnach, Valparaiso, and John J. Plisky, Munster, all of Ind., assignors to The Anderson Company, Gary, Ind.

Filed Oct. 28, 1975, Ser. No. 626,077
Int. Cl.[2] B60S 1/04
U.S. Cl. 15—250.42 **2 Claims**



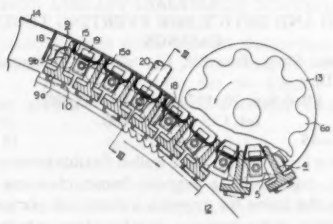
1. A windshield wiper blade having an articulated superstructure, a wiper refill unit, means on said superstructure for slidably engaging said wiper refill unit, said wiper refill unit having a resilient wiping element and a backing strip, said wiping element having a pair of oppositely facing grooves separated by a web, said backing strip having a slot extending lengthwise thereof with the end portions of said slot having a width substantially equal to the width of said web in the wiping element, the width of said slot tapering toward the midportion of the backing strip so that said slot is narrower at the midportion than at said end portions, said backing strip being seated in said grooves in said wiping element with said web nesting in said slot, the walls of said narrower portion of the slot in the backing strip compacting the midportion of said web in said wiping element, said backing strip having spaced apart outer edges with each outer edge lying in a plane, and said web urging said midportion of the backing strip outward so that the outer edges of the backing strip at said midportion project outward beyond said planes of said outer edges, and seat in said means on said superstructure.

4,075,732

CLEANING DEVICE APPLIED TO FLATS OF A REVOLVING FLAT CARD

Hidejiro Araki, Toyoake, and Susumu Otani, Obu, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Dec. 31, 1975, Ser. No. 645,519
Claims priority, application Japan, Jan. 8, 1975, 50-4799
Int. Cl.[2] D01G 15/76
U.S. Cl. 15—301 **7 Claims**



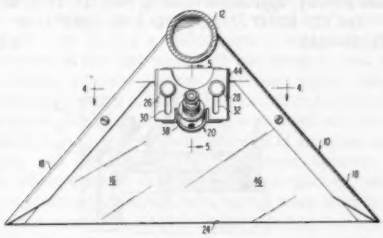
1. A cleaning device for preventing discharge of short fibers and dust from a revolving flat card into the atmosphere of the carding room by an air stream emerging from spaces between adjacent ones of a plurality of flat bars, said flat bars being carried by a pair of spaced link chains revolving at positions above the cylindrical working surface of a main cylinder of said card, so that said flat bars move through a working path having a portion adjacent said cylindrical working surface, each of the link chains being provided with a plurality of link members, a pair of curved bars mounted on corresponding side frames of said card so that each flat bar slides on a corresponding curved bar at both end portions thereof, said cleaning device comprising cover plates rigidly held by each of said curved bars in such a manner that said cover plates define curved spaces along the path of movement of the end portions of the flat bars adjacent said cylindrical working surface, resilient sealing members rigidly held by said link members in such a manner that said resilient sealing members seal open spaces between adjacent flat bars, said cover plates, offset portions thereof, and part of said revolving card cooperating to form corresponding ducts, said resilient sealing members and said flat bars cooperating to form conduits communicating with said ducts, and discharge pipes connected to said ducts whereby said short fibers and dust in the air stream emerging from said conduits between adjacent flat bars to said ducts are discharged from said card through said discharge pipes.

4,075,733

CLEANING HEAD

Carl Parise, Reno, and James M. Wimsatt, Carson City, both of Nev., assignors to Parise & Sons, Inc., Reno, Nev.

Filed Apr. 7, 1976, Ser. No. 674,696
Int. Cl.[2] A47L 7/00
U.S. Cl. 15—322 **1 Claim**



1. In a cleaning head for a hot water extraction system which comprises:

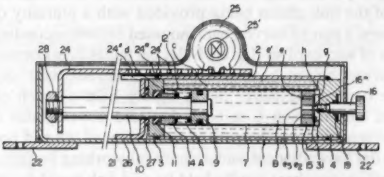
(a) walls defining a vacuum chamber one side of which is open to the exterior and

(b) means for spraying a jet of atomized hot water against the plane defined by the open side of the vacuum chamber defined by said walls, the improvement wherein said means is mounted on one of said walls by means of two screws which pass through slots in said means and thread into one of said walls, the major axes of said slots being perpendicular to the plane defined by the open side of the vacuum chamber defined by said walls, whereby the distance of said means from the plane defined by the open side of the vacuum chamber defined by said walls can be varied, thereby varying the area of impact of the jet of atomized hot water on the plane defined by the open side of the vacuum chamber defined by said walls.

4,075,734
DOOR CLOSER

Tosiro Nagase, Sagamihara, Japan, assignor to Tokico Ltd., Japan

Filed Jul. 21, 1976, Ser. No. 707,290
Int. Cl.[2] E05F *3/22*
U.S. Cl. 16—58 4 Claims

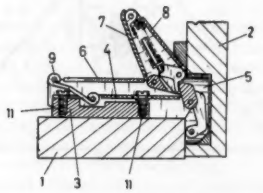


1. A door closer comprising a horizontally disposed inner cylinder, a piston slidable in the inner cylinder, an outer cylinder surrounding the inner cylinder and spaced therefrom for defining an annular space therebetween, the wall of the inner cylinder having holes therein at the opposite ends thereof connecting the interior of the inner cylinder with said annular space, a piston rod extending from said piston out through one end of the cylinders and being adapted to operate a door for moving the door in the closing direction when the rod moves out of the cylinder, hydraulic fluid filling the interior of said inner cylinder, said holes and a part of said annular space, a high pressure gas filling the remaining part of said annular space, and resisting force generating means in the flow path of the hydraulic fluid from the other end of the inner cylinder to the outer cylinder for generating a resisting force to flow of hydraulic fluid when the rod moves in the door closing direction.

4,075,735
SNAP-TOGGLE HINGE

Erich Röck, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Hochst, Austria

Filed Nov. 8, 1976, Ser. No. 740,242
Claims priority, application Austria, Nov. 13, 1975, 8673/75
Int. Cl.[2] E05D *11/10;* E03D *3/06;* E05F *1/14*
U.S. Cl. 16—145 6 Claims



1. A snap-toggle hinge for connecting the door of an article of furniture to a side wall of the article of furniture, wherein said door is capable of swinging more than 90° between closed and opened positions thereof, said hinge comprising:

a first abutment member attachable to a door of an article of furniture;

a second abutment member attachable to a side wall of said article of furniture;

a plurality of pivot arm means, connected seriatim, for connecting said first and second abutment members such that said door is swingable with respect to said side wall by an angle of more than 90° between closed and fully opened positions of said door;

a toggle segment pivotally connected to said first abutment member, said toggle segment having a projection extending therefrom;

a guide member pivotally connected to said second abutment member, said guide member having extending therethrough an opening, said opening being completely laterally enclosed and defined by internal wall surfaces;

said projection extending into said opening when said door is in said closed position, and said projection being without said opening when said door is in said opened position;

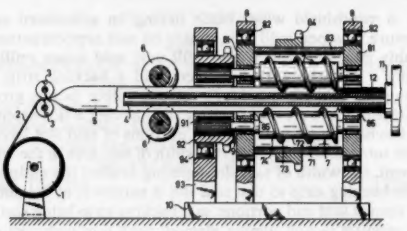
one of said internal wall surfaces defining said opening being convex and dimensioned such that a surface of said projection slides against said convex internal surface during movement of said door into and out of said closed position; and

spring means for urging said projection into said opening when said door is in said closed position.

4,075,736
PROCESS AND APPARATUS FOR SHIRRING TUBULAR CASINGS

Ernst Riegler, Walluf, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Feb. 26, 1974, Ser. No. 445,982
Claims priority, application Germany, Feb. 27, 1973, 2309721
Int. Cl.[2] A22C *13/00*
U.S. Cl. 17—42 3 Claims



1. In the process for shirring cylindrical tubular casings, especially artificial sausage casings of synthetic material, in which an inflated casing is conveyed in the direction of its longitudinal axis and shirred, with pleating, against a counterforce by shirring forces acting upon the circumference of the casing,

the improvement which comprises applying the shirring forces by at least two worm means, the longitudinal axes of which extend parallel to the longitudinal axis of the inflated casing and the teeth of which are in frictional contact with the inflated tube and depress it, said worm means rotating about their longitudinal axes and simultaneously revolving at a radial distance around the circumference of the inflated tubular casing.

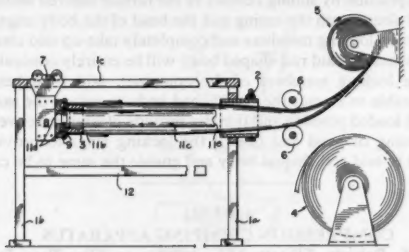
4,075,737
METHOD AND DEVICE FOR EVERTING TUBULAR CASINGS

Alfred Donald Story, Danville, Ill., assignor to Teepak, Inc., Chicago, Ill.

Filed Sep. 20, 1976, Ser. No. 724,893
Int. Cl.[2] A22C *13/00*
U.S. Cl. 17—45 11 Claims

1. A device for everting a thin-walled flexible tubular casing or the like, comprising a support frame, clamping means mounted on the frame for gripping a distal end portion of an everted portion of the casing, a ring for placement in a loop formed by a juncture between said everted portion and a following noneverted portion attendant to said portions being

telescoped with respect to each other, and means external of said casing for displacing said ring relative to said clamping



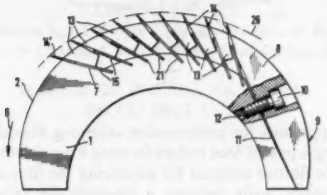
means lengthwise of the casing for thus everting said noneverted portion of the casing.

4,075,738

CIRCULAR COMB FOR COMBING MACHINES

Josef Egerer, Schwabach, Germany, assignor to Staedtler & UHL, Schwabach, Germany

Filed Jul. 6, 1976, Ser. No. 703,109
Claims priority, application Germany, Jul. 10, 1975, 2530839
Int. Cl.[2] D01G *19/10*
U.S. Cl. 19—234 7 Claims



1. A circular comb for combing machines comprising a segment-shaped member having a cutout accommodating individual needle strips located parallel to each other and pressure strips inside said cutout of said segment-shaped member, said pressure strips comprising a pressure member and a flexible lamination connected to said pressure member, each of said pressure members being located between said needle strips and fastened to said segment-shaped member, fastening means for fastening a free end of said lamination to said segment-shaped member, a clamping strip at one end of said cutout and detachably connected to said segment-shaped member, said clamping strip pressing all needle strips and pressure members against one another and against an opposite lateral surface at the other end of said cutout, said lateral surface being a support surface for the adjacent needle strip.

4,075,739

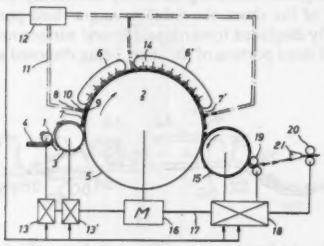
METHOD AND APPARATUS FOR CONTROLLING A CARD

Paul Staheli, CH-9535 Wilen near Wil, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Oct. 29, 1975, Ser. No. 626,864
Claims priority, application Switzerland, Nov. 1, 1974, 14652/74
Int. Cl.[2] D01H *5/32*
U.S. Cl. 19—240 11 Claims

1. A method of controlling a card having a plurality of operating elements for producing a sliver including a rotating main cylinder receiving and conveying a fiber layer thereon, a plurality of flats disposed about the cylinder, a licker-in roll for transferring a fiber layer to the cylinder and doffing rolls downstream of said main cylinder for doffing the fiber layer from the main cylinder; said method comprising the steps of

measuring pressure differences caused by air contained in the fiber layer on the main cylinder due to variations in fiber layer thickness and independently of any outside air



source, the amount of contained air being correlated to the thickness of the fiber layer; and

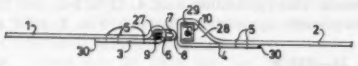
controlling at least one of the operating rolls in the path of the fiber layer in response to predetermined measured pressure differences to obtain a uniform sliver.

4,075,740

WIRE CLOTH JOINT AND A METHOD AND MEANS FOR MAKING THE SAME

Einar Gustav Vilhelm Svensson, Box 61, S 310 33 Holm, Sweden

Division of Ser. No. 660,933, Feb. 24, 1976. This application Jul. 27, 1976, Ser. No. 708,983
Claims priority, application Sweden, Mar. 10, 1975, 7502616
Int. Cl.[2] F16G *3/02*
U.S. Cl. 24—31 B 1 Claim



1. A wire cloth joint comprising the joined confronting ends of two wire cloths including warp and weft threads, respective wire cloth ends having a folded portion secured by seams, characterized in that one wire cloth has, along its end, a wire screw rigidly attached thereto, said wire screw extending along the entire length of said one wire cloth end and including free loops projecting beyond the one wire cloth end, the other wire cloth having weft threads removed at an outer edge of said fold and defining intermittent spaces between warp threads where the weft threads have been removed, said free loops penetrating said spaces between the warp threads at the edge of said other wire cloth end and extending into the space within the fold of said other wire cloth, and a locking wire penetrating all of the free loops in said space of the other wire cloth and retaining the two wire cloth ends together as a wire cloth joint.

4,075,741

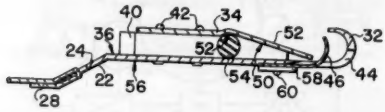
AUTOMATICALLY DISENGAGABLE SAFETY BUCKLE

Andrew Barbal, 147-29 16th Road, Whitestone, N.Y. 11357

Filed Nov. 2, 1976, Ser. No. 738,071
Int. Cl.[2] A44B *11/00*
U.S. Cl. 24—201 TR 2 Claims

1. An automatically disengagable safety buckle comprising a C-shaped rod being disposed pivotably secured to one end of a first flexible strap, a plate being disposed pivotably secured to one end of a second flexible strap, a portion of the marginal edge of the plate being disposed forming a hook, the plate having an opening adjacent the hook, a resilient spring-like member being disposed passing through the opening in the plate and having a hook-like end disposed adjacent to and

parallel with the hook and located intermediate the hook and said one end of the second flexible strap, a sheet being disposed fixedly secured to the plate and spaced outwardly therefrom on a lateral surface of the plate, the sheet having a first portion thereof being disposed a fixed distance apart from said lateral surface of the plate, the sheet having a second portion thereof being disposed extending arcuately outwardly from said first portion of the sheet, the sheet having a third portion thereof angularly displaced towards said lateral surface and said opening, said third portion of the sheet being disposed adjacent said



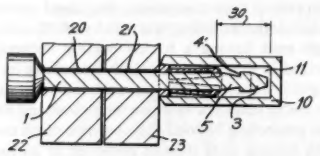
opening, said first portion of the sheet being disposed adjacent said one end of the second flexible strap, said second portion of the sheet being disposed intermediate said first and said third portions of the sheet, a bar, said bar being disposed intermediate said lateral surface of the plate and the adjacent lateral surface of the sheet, one end of the bar being wedge-shaped and being disposed intermediate the sheet and said one end of the second flexible strap, the other end of the bar being disposed in touching engagement with said third portion of the sheet and said first portion of the sheet.

4,075,742

ENGAGEMENT LOCK HAVING TWO STAGES OF ENGAGEMENT AND ASSOCIATED METHOD

Preben Michael Remark, Tjornevej 10, DK-2800 Lyngby, Denmark. and Aksel Johannes Jensen, Copenhagen, Denmark, assignors to Preben Michael Remark, Lyngby, Denmark

Continuation-in-part of Ser. No. 546,895, Feb. 4, 1975, abandoned. This application Aug. 4, 1976, Ser. No. 711,687
Claims priority, application Denmark, Feb. 5, 1974, 609/74
Int. Cl.[2] E05C *19/18*
U.S. Cl. 24—211 R **9 Claims**



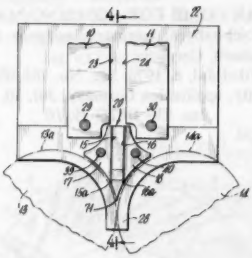
1. An engagement lock in combination with a pair of locking members of given thickness having aligned apertures, the lock comprising first and second members adapted for automatic interlocking engagement after the first member has been passed through the locking members of the container and is introduced into a cavity provided in the second member, said first member being a rod-shaped body having a head at one end and tapered insertion end at the other end, said tapered end having an abruptly reduced cross-sectional area slightly rearwards of the tapered section so as to form a shoulder, a further tapered section extending from said shoulder on the rod-shaped body, said second member including a casing with a bore, a tubular sleeve open at both ends disposed in said bore with substantially no mobility in the axial direction, said sleeve being slit at the end located innermost within said casing and having a sectional area at that end permitting the shoulder of the rod-shaped body to pass through the tubular sleeve only as a result of the elasticity of the slit end of the sleeve, and wherein in the locked position when the shoulder has passed through the sleeve a clearance is provided between the casing or head and a respective one of the locking members sufficient to permit the insertion of a cutting tool, at least an equal clearance being provided between the insertion end of the rod and the bottom of the casing, so that the rod-shaped body after the locking and against resistance from an expansion of the slit sleeve can be further advanced into the casing to a fully inserted position by sliding contact of the further tapered section in said sleeve until the casing and the head of the body engage respective locking members and completely take-up said clearance, whereby said rod-shaped body will be entirely concealed by the locking members of the container, said head being engageable to retract the rod-shaped body to return the same to said loaded position and thereby provide clearance between the casing or head and one of the locking rings to provide access to said rod-shaped body and enable the same to be cut.

4,075,743

COMPRESSION CRIMPING APPARATUS

John S. Roberts, Ellicott, Md., assignor to Kling-Tecs, Inc., Columbia, Md.

Filed Jun. 16, 1976, Ser. No. 696,698
Int. Cl.[2] D02G *1/12*
U.S. Cl. 28—263 **3 Claims**



1. In apparatus for compression crimping fibrous material comprising a pair of feed rollers forming a nip therebetween to engage the fibrous material for advancing the fibrous material and stationary walls defining a chamber for receiving the fibrous material from the rollers and in which chamber the fibrous material is compressed to form a plug of yarn, the trailing end of which becomes situate downstream of the nip of the rollers and against which the yarn entering the chamber impinges, said chamber having corners, the periphery of the rollers along the sides thereof intercepting said corners downstream and outwardly of the nip formed by the rollers, the improvement comprising said stationary walls forming stationary surface means in said chamber immediately adjacent said roller sides for keeping the fibrous material entering said chamber at a location upstream of the trailing end of the plug towards said roller sides away from the intercepted corners, said stationary surface means comprising two opposing surfaces extending within and being formed along the lines of the cusp between and on both sides of said rollers from adjacent the nip of the rollers and downstream to adjacent said corners, and inclining inwardly towards one another from the nip in the direction in which the fibrous material is advanced, whereby the catching of fibers from the fibrous material at the intercepted corners is prevented.

4,075,744

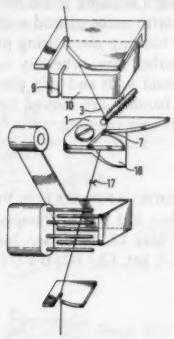
THREAD TESTING APPARATUS FOR TEXTILE MACHINES

Kresimir Mista, and Ditmar Gerstner-Stevens, both of Obertshausen, Germany, assignors to Karl Mayer Textilmaschinenfabrik GmbH, Obertshausen, Germany

Filed Sep. 20, 1976, Ser. No. 724,505
Claims priority, application Germany, Oct. 2, 1975, 2543983
Int. Cl.[2] D01H *13/22*
U.S. Cl. 28—224 **7 Claims**

1. In a thread testing apparatus having a fault sensing zone operable to receive a strand of thread and detect faults in said

thread as the strand moves through the zone along a usual strand path, the strand being removable from said zone, the improvement comprising:



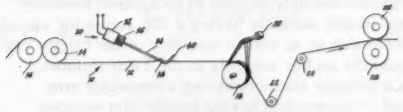
a thread inserter located before said fault sensing zone and adapted to insert said thread into said fault sensing zone, said thread inserter including a knot detecting means for detecting knots of predetermined dimensions in said thread.

4,075,745

APPARATUS FOR MANUFACTURING FILAMENTS OF VARYING DENIER

Alan H. Norris, and Phillip W. Chambley, both of Rome, Ga., assignors to Champion International Corporation, Stamford, Conn.

Filed Feb. 25, 1977, Ser. No. 771,954
Int. Cl.[2] D02J *1/22*
U.S. Cl. 28—243 **4 Claims**



1. An apparatus for fabricating filaments exhibiting variations in denier along its length comprising:

a. means to propel a running length of filament from a feed roller to a draw roller, and

b. electrically activated tension means disposed between said feed roller and said draw roller engaging said filament for providing variable tension thereon, said electrically activated tension means comprising electrically rotatable means having an output shaft coupled thereon, said output shaft being provided with engaging means for engaging said filament and slidably capturing said filament for entwinement on said output shaft.

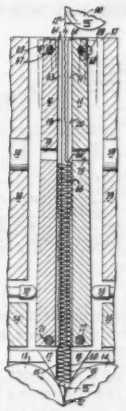
4,075,746

COMPRESSION CRIMPING APPARATUS

John S. Roberts, Ellicott, Md., assignor to Kling-Tecs, Inc., Columbia, Md.

Filed Jun. 16, 1976, Ser. No. 696,697
Int. Cl.[2] D02G *1/12*
U.S. Cl. 28—264 **3 Claims**

1. Apparatus for compression crimping filamentary yarn comprising means defining a compression crimping zone, means for feeding filamentary yarn into the compression crimping zone, a pair of movable members each having a face substantially opposed to a face of the other, said faces defining lateral walls of the zone, means for positively biasing said members toward each other to restrict egress of the yarn from the zone and thereby constituting said members as means for exerting a back pressure on the yarn, causing the yarn to buckle, form a plug in the zone and thereby crimp in the zone, opposing surface means downstream of said feeding means and upstream of said movable members for initially guiding and establishing the lateral cross-sectional dimension of the plug, said members extending downstream from the downstream



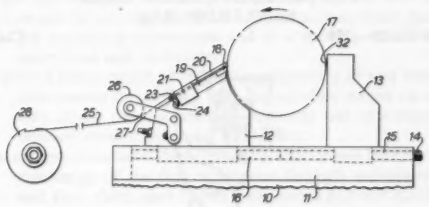
ends of said opposing surfaces for substantially the length of said zone, each said face of each of the members being restricted by opposing wall means extending from the member for preventing filaments of the plug from escaping from between the members.

4,075,747

MANUFACTURE OF METAL STRIP

David P. Hague; Dalip T. Malkani; Andrew Middlemiss, and Stuart Scholey, all of Sheffield, England, assignors to British Steel Corporation, London, England

Filed Nov. 29, 1976, Ser. No. 745,559
Claims priority, application United Kingdom, Nov. 28, 1975, 49056/75
Int. Cl.[2] B21D *33/00*
U.S. Cl. 29—18 **9 Claims**

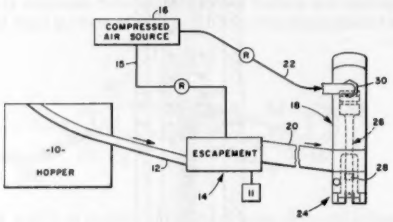


1. Apparatus for manufacturing metal strip from a cylindrical metal workpiece including means for rotating the workpiece about its longitudinal axis, a cutting tool together with means for feeding said cutting tool continuously into the peripheral surface of the workpiece so as to produce a continuous metal strip peeled from the surface of the workpiece, coiler means for collecting the peeled strip, clamp means positioned to receive the leading portion of the strip peeled from the workpiece and connected to the coiler means, means for guiding and leading portion of peeled strip towards and into the mouth of the clamp means, and means responsive to the leading portion of the strip entering the mouth of the clamp means to actuate the clamp means to grip the leading portion of the peeled strip and to cause the coiler means to pull the clamped strip around the coiler.

4,075,748
FASTENER EMPLACEMENT MECHANISM

Albert T. Buttriss, Fairview Park, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 28, 1977, Ser. No. 763,373
Int. Cl.[2] B23P *19/04*; B25D *9/18*
U.S. Cl. 29—225 **16 Claims**

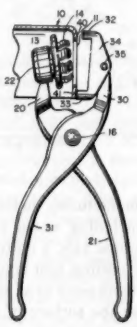


1. An automatic fastener emplacement device for applying fasteners one at a time to a work piece, said device comprising:
a source of oriented fasteners;
an assembly tool having a nose piece for receiving the work piece therein and a ram for driving fasteners from the nose piece onto the work piece, said nose piece having an open end for receipt of the work piece therein and ejection of fasteners therefrom;
a delivery system for conveying fasteners one at a time from said source to said nose piece;
an escapement assembly for controlling said delivery system; and
a trigger activated control mechanism including a trigger located within said nose piece, said control upon contact of said trigger effective to cause said escapement assembly to release a single fastener from said source to said delivery system and to cause said delivery system to convey said released fastener to said nose piece and upon termination of contact with said trigger effective to cause said ram to drive said delivered fastener from said nose piece.

4,075,749
TOOL FOR CLOSING A WALL OPENING

Jerry Hubeny, 2229 S. Elmwood Ave., Berwyn, Ill. 60402

Filed Dec. 15, 1975, Ser. No. 640,955
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—268 **1 Claim**



1. A tool for closing an opening in a wall comprising a pair of pliers pivotally connected at their central portions, said pliers providing handles at the rearward portions and providing at their forward portions a pair of jaws, a magnet at the forward end of one of said jaws, said magnet being cylindrical and having its longitudinal axis transverse with the longitudinal axis of said one jaw and having a flat circular magnetized surface facing the other of said jaws, a metallic plug having a circular flat metallic disc which is adjacent said magnetized surface and held thereon by the force of said magnet, the other of said jaws having a backing piece having a pair of backing members aligned with areas of said wall on opposite sides of said opening, said backing piece being pivotally attached at its center with said other jaw, whereby when said jaws are on opposite sides of said wall and said plug is aligned with said opening and said handles are moved toward each other, said plug is moved into said opening.

4,075,750
CONNECTOR TOOL APPARATUS FOR CEILING CLIPS

Ronald E. Collumber, 823 N. Chautauqua, Wichita, Kans. 67214

Filed May 13, 1976, Ser. No. 686,175
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—278 **2 Claims**

1. A connector tool apparatus operable to secure a hanger clip to a bottom wall of a T-bar member; comprising:
(a) a handle assembly secured to an actuator assembly;
(b) said handle assembly having a clip connector assembly connectable to an anchor assembly of the hanger clip to secure the anchor assembly to the T-bar member;
(c) said actuator assembly having a connector arm;
(d) said connector arm having parallel arm sections;
(e) each arm section having an outer connector head connectable to a connector nut of the hanger clip; whereby said connector arm is rotatable to place the connector nut on the anchor assembly;
(f) said clip connector assembly having a connector coupling connected to a shaft member;
(g) said connector coupling having a threaded opening to threadably receive a connector shaft of the hanger clip in order to rotate the anchor assembly;
(h) said shaft member having an externally threaded end section with a central hole therein;
(i) said clip connector assembly having a set screw member threadably mounted in said threaded opening in said connector coupling; and
(j) said set screw member having a conical end section mounted in said central hole to secure said shaft member to said connector coupling.

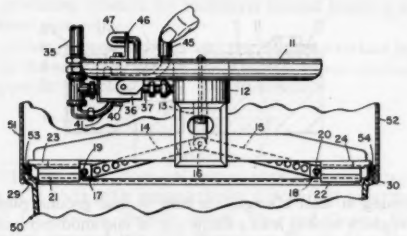
4,075,751
METHOD OF SECURING SHEET METAL TO PLASTIC

Lincoln Paul Tschoop, and Marcel Alfred Steiner, both of Wichita, Kans., assignors to The Coleman Company, Inc., Wichita, Kans.

Filed Nov. 8, 1976, Ser. No. 739,636
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—432.1 **1 Claim**

1. A method of securing first and second metal wall portions to first and second plastic base wall portions comprising: forming an elongated groove at one edge of each of said first and

second metal wall portions and assembling said grooves respectively to conforming edges of said plastic wall portions; placing first and second punch heads between said first and second metal wall portions and adjacent the opposing surfaces of the grooves thereof; said punch heads being mounted to a



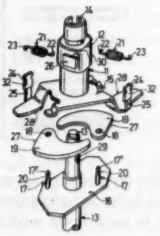
frame for sliding motion in opposing directions; and using pneumatic pressure to actuate a cylinder and linkage to urge said punch heads apart in linear motion, the punch points thereof indenting and at least partially tearing opposing portions of said grooves respectively, the torn portions being embedded in plastic received in said groove.

4,075,752

METHOD OF MAKING DISTRIBUTOR ASSEMBLY BEARING STRUCTURES AND THE LIKE

Hartmut Brammer; Karl Ehrmann; Heinz Haug; Jörg Issler; Günter Käs, all of Stuttgart; Harald Kalippke, Hohenacker; Herbert Mägdefrau, and Karl-Heinz Schneider, both of Sonthofen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Continuation of Ser. No. 307,387, Nov. 17, 1972, abandoned.
This application Apr. 15, 1974, Ser. No. 460,753
Claims priority, application Germany, Nov. 20, 1971, 2157658
Int. Cl.[2] B23P *15/00*
U.S. Cl. 29—434 **2 Claims**



1. Method of manufacturing a mechanical assembly of the shaft and the shift plate bushing of an ignition distributor of an internal combustion engine, which assembly provides for relative movement of said shaft and shift plate bushing with reduced frictional wear, comprising the steps of:

cutting into short pieces a length of wear-resistant tubing of substantially uniform wall thickness and made of a resin material having a cross-linked molecular structure;

putting one of said pieces, in the form in which it is obtained after the aforesaid step of cutting said length of tubing, over a distributor shaft so as to produce a tight-fitting coating over a surface of said shaft in position to bear against a distributor shift plate bushing during relative movement of said shaft and bushing;

shrinking said piece of tubing in place on said distributor shaft by application of heat thereto, and

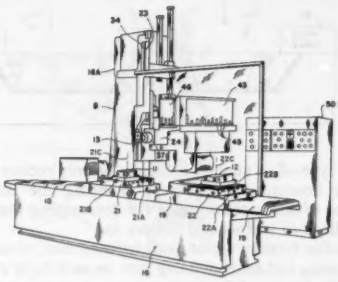
assembling said shaft so coated together with said bushing in such a way as to constrain said bushing to move in frictional contact with said coating of said shaft.

4,075,753

PLURAL SLIDE MACHINE

Nagle V. Gusching, and Kermit T. Kuck, both of Sidney, Ohio, assignors to The Monarch Machine Tool Company, Sidney, Ohio

Filed Oct. 17, 1975, Ser. No. 623,435
Int. Cl.[2] B23C *1/14;* **B23Q** *3/157*
U.S. Cl. 29—568 **15 Claims**



1. A plural slide machine for machining a first and a second workpiece by a workpiece tool, comprising in combination:

a frame;

first and second slide means;

first and second mountings on said first and second slide means for securing the first and the second workpiece, respectively;

way means mounted relative to said frame receiving said first and second slide means enabling movement thereof along a substantially horizontal plane;

third slide means;

means mounting said third slide means for movement relative to said frame in a substantially vertical plane;

means connected for moving said third slide means;

a toolholder for holding the workpiece tool;

means mounting said toolholder for movement with said third slide means;

fourth slide means enabling third dimensional movement between said toolholder and the first and second workpieces on said first and second slide means;

means connected to move said fourth slide means;

first drive means connected continuously to said first slide means for moving said first slide means on said way means for machining movements and to a standby position remote from said toolholder;

second drive means connected continuously to said second slide means for moving said second slide means on said way means for machining movements and to a standby position remote from said toolholder;

and control means connected to said slide means for enabling machining of the first workpiece through movement of said first, third, and fourth slide means and for enabling machining of the second workpiece through movement of said second, third, and fourth slide means.

4,075,754

SELF ALIGNED GATE FOR DI-CMOS

Koy B. Cook, Jr., Mount View, Calif., assignor to Harris Corporation, Cleveland, Ohio

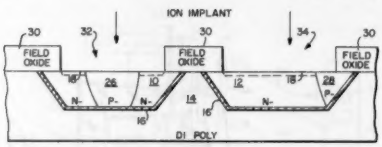
Continuation of Ser. No. 445,861, Feb. 26, 1974, abandoned.
This application Mar. 30, 1976, Ser. No. 671,772
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—571 **20 Claims**

1. A process for fabricating complementary metal oxide field effect devices in a substrate of a first conductivity type having a flat surface comprising the steps of:

selectively doping a portion of a first region of said substrate in which a channel of a first device is to be formed with impurities opposite to said first conductivity type of an

amount sufficient to change the conductivity type of the selectively doped portion for determining the threshold voltage of said first device;

doping a second region of said substrate, spaced from said first region, in which a channel of a second device, of a channel type opposite the channel type of said first device, is to be formed with impurities of said opposite conductivity type of an amount sufficient to only reduce the impurity concentration without changing the conductivity type of said second region for determining the threshold voltage of said second device; and



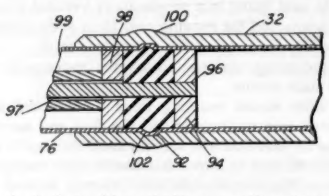
thereafter forming a gate oxide layer on each of said regions, forming a channel defining gate on each layer of said gate oxide layer and forming source and drain zones for said devices using said gates as alignment masks.

4,075,755

HIGH VOLTAGE FUSE AND METHOD OF ATTACHING TUBULAR MEMBERS THEREIN

Joseph Bernatt, Arlington Heights, and Alfred Steegmueller, Skokie, both of Ill., assignors to S&C Electric Company, Chicago, Ill.

Filed Nov. 11, 1976, Ser. No. 741,026
Int. Cl.² H01H *69/02*
U.S. Cl. 29—623 **15 Claims**



1. A method of attaching a hollow metallic tube to a hollow insulator tube in the manufacture of a high voltage circuit interrupter comprising the steps of:

a. forming a groove on the interior of the insulator tube;

b. inserting the metallic tube into the insulator tube to a desired location; and

c. expanding the metallic tube at a position where attachment is desired until the metallic tube engages the groove and the insulator tube is slightly, exteriorly, and outwardly deformed adjacent the expansion of the metallic tube.

4,075,756

PROCESS FOR FABRICATING ABOVE AND BELOW GROUND PLANE WIRING ON ONE SIDE OF A SUPPORTING SUBSTRATE AND THE RESULTING CIRCUIT CONFIGURATION

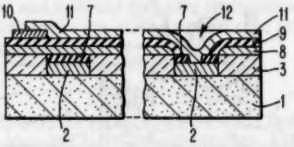
Charles John Kircher, Yorktown Heights, and Hans Helmut Zappe, Granite Springs, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,059
Int. Cl.² H05K *3/00*
U.S. Cl. 29—625 **24 Claims**

1. A process for fabricating above and below ground plane wiring on one side of a supporting substrate comprising the steps of:

forming a plurality of anodizable metallic conductors surrounded by insulation on the surface of a substrate which is conductive at room temperature,

forming a conductive ground plane of anodizable metallic material on said insulation in insulated spaced relationship with said anodizable metallic conductors,



forming at least a single via hole in said ground plane in registry with at least a single one of said anodizable metallic conductors,

forming insulation on said ground plane, and,

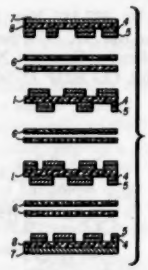
forming a plurality of metallic conductors on said ground plane insulation.

4,075,757

PROCESS IN THE PRODUCTION OF A MULTILAYER PRINTED BOARD

Hans R. Malm; Peter J. Nilsson, both of Perstorp, Sweden, and Jiri K. Konicek, Broad Brook, Conn., assignors to Perstorp AB, Perstorp, Sweden

Filed Aug. 9, 1976, Ser. No. 712,863
Claims priority, application Sweden, Dec. 17, 1975, 7514242
Int. Cl.² H05K *3/06, 3/36*
U.S. Cl. 29—625 **7 Claims**



1. A process for the production of a multilayer printed board with plated-through holes for electronic use having a desired conductive pattern in each layer with increased adhesion between the layers, comprising:

a. forming a plating resist layer in the shape of a negative of the desired conductive pattern on the inner surfaces of a desired number of insulating bases having both sides coated with an unpatterned metal layer of copper or a copper alloy to leave remaining visible parts forming the desired conductive pattern,

b. electroplating said remaining visible parts of the metal coated layers with a thin, rough, adhesion-promoting metal layer comprising at least one metal selected from the group consisting of copper, zinc, nickel, tin, and alloys thereof, and in the event copper, zinc or an alloy thereof is electroplated, then further electroplating on top of this adhesion-promoting layer an etch resist layer of nickel, tin or an alloy thereof,

c. removing the negative plating resist layer applied in step (a),

d. etching away the parts of the metal layer uncovered by step (c),

e. placing between the insulating bases provided with the conductive patterns at least one layer of plastic or a fiber

material impregnated with partially cured or hardened plastic to form a composite,

f. laminating under heat and pressure the composite article of step (e) to form a multilayer printed board having an extremely good adhesion between the metal patterns and the plastic layers,

g. producing holes in the multilayer printed board in a desired pattern, and

h. plating through the holes and providing the surface layers on the multilayer printed board with a desired conductive pattern.

4,075,758

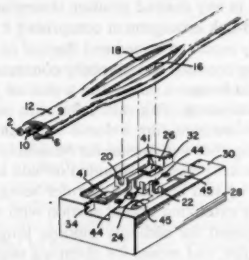
METHOD FOR TERMINATING SHEATH COVERED CABLE AND FOR PROVIDING A WIRING SYSTEM

Stuart L. Parsons, Belleair Beach, Fla., and George Henry Vigeant, deceased, late of St. Petersburg, Fla. (by Mrs. George Henry Vigeant, heir), assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 337,513, March 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 84,009, Oct. 26, 1970, abandoned. This application Aug. 26, 1976, Ser. No. 717,820

Int. Cl.[2] H01R *43/00*

U.S. Cl. 29—628 **4 Claims**



1. In a method for preparing a sheath covered three conductor cable, including two outer conductors individually covered with insulation and a centrally located uninsulated ground conductor, for assembly with electrical terminals contained in a housing, the improvement comprising the steps of:

piercing said sheath on opposite sides of said ground conductor,

slicing entirely through said cable intermediate the ends thereof and longitudinally on both sides of said ground conductor and between said ground conductor and each of said insulation covered conductors to divide said sheath into longitudinal slitted portions overlying said conductors,

spreading apart said insulation covered conductors laterally from said ground conductor while maintaining said slitted portions of said sheath over said insulation covered conductors,

locating said ground conductor and said spread apart insulation covered conductors together with said slitted portions of said sheath over corresponding electrical terminals in said housing, with said conductors and with said outer sheath extending uninterrupted from one open end of said housing to another open end thereof,

forcibly inserting said spread apart conductors together with said slitted portions of said sheath in between two slicing edges of corresponding spaced apart electrical terminals, thereby forcing the slicing edges to slice through the slitted portions of said sheath and the insulation covering said outer conductors, resulting in a high speed termination of said three conductor cable without interrupting either the conductors or the outer sheath.

4,075,759

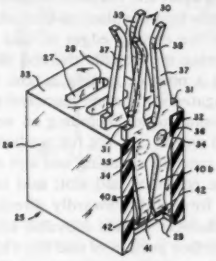
TRANSVERSE CONNECTOR ASSEMBLY METHOD

Jerzy R. Sochor, Manhattan Beach, Calif., assignor to Elco Corporation, El Segundo, Calif.

Division of Ser. No. 569,100, Apr. 17, 1975, Pat. No. 4,004,845. This application Jul. 19, 1976, Ser. No. 706,385

Int. Cl.[2] H02G *15/00*

U.S. Cl. 29—629 **7 Claims**



1. A method for assembling contacts into elongated insulator housings to form connectors, comprising:

providing a plurality of insulator housings having a line of contact-receiving apertures along the length of each housing,

positioning said plurality of elongated insulator housing in side-by-side, parallel relationship so that corresponding apertures of said respective housing are aligned in rows intersecting the line of apertures of each housing,

providing an integral elongated strip of contacts including an integral carrier portion, with the spacings between said contacts along said carrier strip corresponding to the spacings between respective apertures of said rows of corresponding apertures,

aligning said contacts with the apertures of one of said rows of corresponding apertures,

inserting said contacts of said strip substantially simultaneously into said one row of corresponding apertures, and

severing said elongated carrier strip from said contacts.

4,075,760

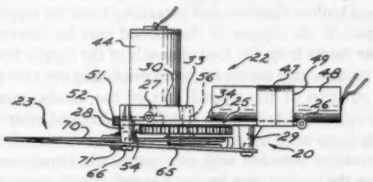
BATTERY OPERATED SHEARS

Robert A. Germain, Ashtabula, Ohio, assignor to True Temper Corporation, Cleveland, Ohio

Continuation of Ser. No. 270,608, July 11, 1972, abandoned. This application Jan. 16, 1974, Ser. No. 433,669

Int. Cl.[2] B26B *19/02*

U.S. Cl. 30—220 **7 Claims**



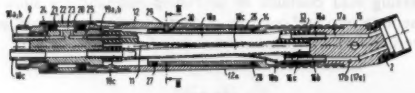
1. A shearing device comprising a housing; a motor mounted within said housing; a fixed blade made of flat, heavy gage sheet metal of substantial stiffness and limited flexibility securely mounted with respect to said housing, said fixed blade having a plurality of laterally spaced, forwardly directed teeth; a movable blade made of flat, heavy gage sheet metal of substantially the same stiffness and limited flexibility as said fixed blade, said movable blade having a plurality of laterally spaced, forwardly directed teeth; pivot means mounting said

blades to each other for laterally oscillating shearing movements; transmission means connecting said motor to said movable blade whereby said motor causes lateral oscillation of said movable blade and teeth with respect to said fixed blade and teeth in rapid shearing movements; said means mounting said blades to each other including means disposing said blades with the flat planes thereof tilted at a set angle convergently in the forward direction whereby the medial and rear portions of said blades are spaced apart and the teeth of each blade tend to project at least partially into the plane of the teeth of the other blade whereby only the cutting edges of said teeth engage during relative shearing movements thereof; the stiffness of said blades ensuring a positive cutting action; said movable blade having an elongated slot therein rearwardly of said pivot means; said transmission means including an eccentric drive pin slidably disposed within said slot for oscillating said movable blade; an insert member engaging said slot and providing wear surfaces at the edges of said slot; said insert member including integrally formed downwardly directed projection means adjacent to the rear of said movable blade in sliding contact with a flat surface portion of said fixed blade whereby said movable blade is supported at its upwardly spaced rear end portion.

4,075,761
DENTAL HANDPIECE

Ernst-August Behne, Bensheim-Auerbach, and Reinhard Straihammer, Kirschhausen, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 22, 1976, Ser. No. 698,795
Claims priority, application Germany, Jul. 24, 1975, 2533189
Int. Cl.[2] A61C *1/10*
U.S. Cl. 32—27 **7 Claims**

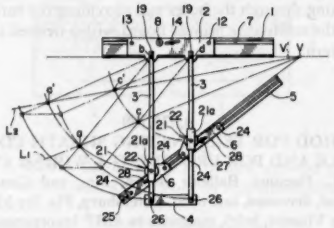


1. In a dental handpiece comprising a handle member which is formed of first and second parts, means interconnecting the two parts for relative rotation therebetween, a supply hose having a plurality of feed channels for a liquid and/or gaseous media being connected to the first part, a head section with a dental tool being connected to the second part, each of the two parts having connecting nipples arranged in the interior thereof, and hollow flexible tubes extending from the nipples of the first part to the nipples of the second part for conveying each of the media from the feed channels of the supply hose to the head section, said means for interconnecting the two parts enabling rotation of the second part of the handle member about a longitudinal axis of the handle member and relative to the supply hose with the flexible tubes compensating for the relative rotation between said two parts, the improvements comprising the second part having a length which amounts to at least one third of the overall length of the handle member, said second part at a free end having a hollow sleeve portion telescopically received in a hollow sleeve portion of the first part, said sleeve portions of the first and second parts forming a bearing disposed in a central axial region of the handle member for supporting the second part and head section for rotation on the first part, and said flexible tubes extending through said central region without support so that the first part is in contact with a hand as the second part and head section are rotated during manipulation of the handpiece.

4,075,762
INSTRUMENT FOR MAKING PERSPECTIVE DRAWING

Kazuomi Ohtake, 6-13, 2 chome, Tenjincho, Fuchu, Tokyo, Japan

Filed Sep. 28, 1976, Ser. No. 727,340
Claims priority, application Japan, Oct. 1, 1975, 50-119171
Int. Cl.[2] B43L *13/14*
U.S. Cl. 33—77 **3 Claims**

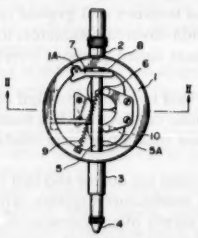


1. An instrument for making perspective drawings comprising a base plate to be located on a drawing board, a slider, means mounting said slider on said base plate for rectilinear sliding movement thereon, means for clamping said slider to said base plate in any desired position therealong, a parallelogram lever-and-link arrangement comprising a pair of parallel levers pivotally mounted at one end thereof on said slider and a link extending between and pivotally connected to the opposite ends of said levers, a ruler, and a pair of joint structures respectively interconnecting said ruler with said levers, each said joint structure including a sleeve establishing a sliding fit on said lever together with means for releasably fastening them together, a bracket pivotally mounted on said sleeve, and shoe means carried by said bracket, said ruler being provided with a longitudinally extending slotted portion with which said shoe means are engaged for slidingly guiding longitudinal movement of said ruler, and means for clamping said shoe means to said slotted portion at any desired position along said ruler.

4,075,763
DIAL INDICATOR GAUGE

Yasuyuki Yamaryo, Utsunomiya, Japan, assignor to Kabushiki Kaisha Mitutoyo Seisakusho, Tokyo, Japan

Filed Jun. 9, 1976, Ser. No. 694,370
Claims priority, application Japan, Jan. 8, 1976, 51-000936[U]
Int. Cl.[2] G01B *3/22*
U.S. Cl. 33—172 R **2 Claims**



1. In a dial indicator gauge comprising a ring-shaped frame member, a spindle mounted for translational movement diametrically of said frame member, and a stopper pin projecting transversely from said spindle and positioned to strike the inner surface of said frame member when said spindle moves more than a predetermined distance relative thereto, the improvement which comprises an elongated buffer member extending across the path of travel of said stopper pin between said stopper pin and said inner surface so as to be struck by said stopper

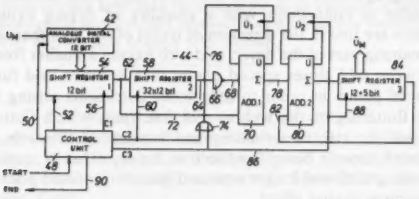
pin before it reaches said inner surface and delimiting an open space between said buffer member and inner surface, said buffer member being both resilient and compressible so that when struck by said stopper pin said buffer member first deforms into said space and is then compressed when further movement of said stopper pin squeezes said buffer member against said inner surface.

4,075,764

DEVICE FOR DETERMINING THE NORTH DIRECTION

Uwe Krogmann, and Uwe Wurditsch, both of Uberlingen, Germany, assignors to Bodenseewerk Geratetechnik GmbH, Uberlingen (Bodensee), Germany

Filed Oct. 8, 1976, Ser. No. 731,024
Claims priority, application Germany, Apr. 29, 1976, 2618868
Int. Cl.[2] G01C *19/38*
U.S. Cl. 33—324 **3 Claims**



1. In an apparatus for determining the north direction comprising a gyro including a housing suspended by a wire, a pickoff responding to deviations of the gyro from a zero position of the wire suspension and producing pickoff signals, a torquer fixed to the gyro housing, means connecting the torquer and the pickoff to apply the pickoff signal highly-amplified to the torquer, said torquer exerting a torque on the gyro about the suspension wire axis counteracting the gyro directing torque, and a measuring device sensitive to the amplified pickoff signal to produce a signal indicative of angle between the gyro axis and north, said measuring device including an analogue-digital converter for producing a timed sequence of digital signals, each digital signal being proportional to the pickoff signal at the time of sampling, and digital filter means connected to said converter for forming a recurrent average value of the sequence of digital signals and for the immediate output of the last average value formed each time, the improvement comprising:

said filter means forms the average value of the digital signals sampled at time intervals T according to the equation

$$\overline{U}_M(nT) = \overline{U}_M((n-1)\cdot T) + 1/N\,[\,U_M(nT) - U_M((n-N)\cdot T)\,]$$

where

n is a consecutive whole number,

$\overline{U}_M(jT)$ the average value output at the time JT,

$U_M(jT)$ the digitalized measuring value at the time jT, and

N a fixed whole number.

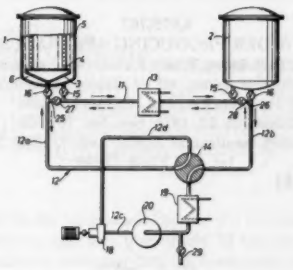
4,075,765

PROCESS AND DEVICE FOR DRYING FIBROUS MATERIAL

Friedrich Wilhelm Johann Karrer, Stockholm, Sweden, and Per Gustaf Mellgren, Montreal, Canada, assignors to Karrer System AG, Zurich, Switzerland

Filed Dec. 12, 1975, Ser. No. 640,390
Claims priority, application Switzerland, Dec. 16, 1974, 16667/74
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.[2] F26B *3/00*
U.S. Cl. 34—20 **7 Claims**

1. A process for drying two separate units of moist fibrous material, in particular in the form of reels of yarn, comprising flowing under a pressure greater than one atmosphere in a closed circuit a gaseous medium through both units of material, such that the gaseous exhaust from one unit is the gaseous



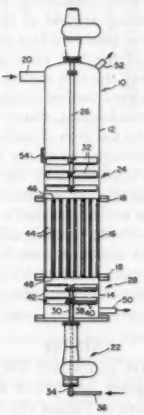
intake of said other unit, and heating the gaseous medium subsequent to its passage through the units of fibrous material by compressing the gaseous medium.

4,075,766

APPARATUS FOR THE TREATMENT OF DIVIDED SOLID MATERIAL

Basil J. Michel, Rochester; Gary P. Morse, Spencerport, both of N.Y., and Alfred L. Wilcox, Arlington Heights, Ill., assignors to General Signal Corporation, Rochester, N.Y.

Filed Jul. 19, 1976, Ser. No. 706,986
Int. Cl.[2] F26B *17/14*
U.S. Cl. 34—57 D **4 Claims**



1. An apparatus for the treatment of divided solid material comprising:

(a) a chamber disposed about a generally vertical axis;

(b) means for introducing said divided solid material into the top portion of said chamber;

(c) means for introducing a pressurized gas into the bottom portion of said chamber; and

(d) impeller means adapted to rotate about said axis for radially dispersing said pressurized gas and for fluidizing said divided solid material, said means for introducing pressurized gas being adapted to rotate with said impeller means to thereby aid in the radial distribution of said pressurized gas, wherein said impeller means is supported by a hollow shaft adapted to receive said pressurized gas and wherein said means for introducing pressurized gas comprises a plurality of perforated tubes affixed to said

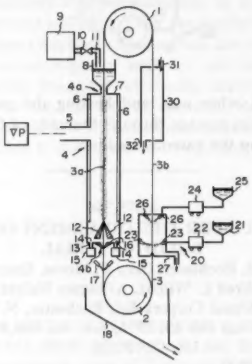
impeller means and adapted to rotate therewith, said perforated tubes being in fluid communication with said hollow shaft to thereby aid in the radial distribution of said pressurized gas.

4,075,767

POWDER PRODUCING APPARATUS

Fumindo Kai, Tachikawa; Eitaro Kumazawa, Sayama, and Yozo Ishioka, Higashikurume, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Sapporo, Japan

Filed Jul. 22, 1976, Ser. No. 707,558
Claims priority, application Japan, Aug. 7, 1975, 50-96168
Int. Cl.[2] F26B *13/30*
U.S. Cl. 34—92 **5 Claims**



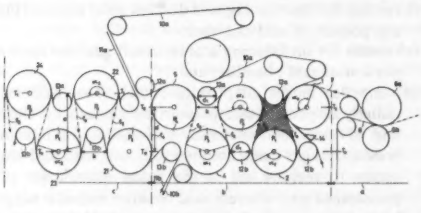
1. Vacuum type powder producing apparatus comprising endless belt means passing around at least a pair of spaced roller means to provide at least two belt runs, vacuum chamber means encircling one of the belt runs and having inlet and outlet means for allowing the belt means to pass therethrough into and out of the vacuum chamber means, means for applying a vacuum to the vacuum chamber, slurry tank means provided in said inlet means of the vacuum chamber means so that said belt means is passed through the slurry tank means whereby slurry is deposited on both sides of the belt means when it passes through the slurry tank means, means for applying slurry to the tank means so that the slurry is maintained therein to a level sufficient to provide a sealing effect at the inlet means of the vacuum chamber means, means for scraping the dried material off the belt means, means provided outside the vacuum chamber for cleaning the belt means.

4,075,768

MULTICYLINDER DRYER

Erkki Koski; Lassi Veijonen, and Martti Koponen, all of Jyvaskyla, Finland, assignors to Valmet Oy, Helsinki, Finland

Continuation-in-part of Ser. No. 259,521, Jun. 5, 1972, abandoned. This application Mar. 31, 1976, Ser. No. 672,469
Int. Cl.[2] F26B *13/08*
U.S. Cl. 34—116 **6 Claims**



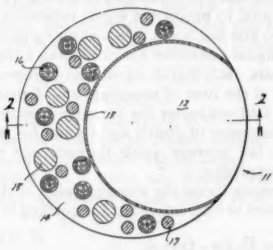
1. A multicylinder dryer for the drying of a web, particularly a paper web, comprising cylinders located alternately in two rows one above the other, drying fabrics and guiding rolls, for said drying fabrics said guiding rolls being situated between adjacent cylinders in both said rows and being positioned so as to cause said fabrics to wrap the web on said cylinders at a central angle, which is substantially smaller than that central angle in which the web wraps the same cylinder, a first one of said cylinders in the direction of travel of said web being a lead-in cylinder, and other cylinders being heated drying cylinders of equal diameters, said web wrapping said drying cylinders at an angle larger than 180°, said web having free and unsupported runs between said two rows, said free runs, drying fabrics and free surface of said drying cylinders bounding a row of pockets through which water vapor flashed from the web is conducted away, the distance between a plane extending through the axes of said drying cylinders located in the upper row and a plane extending through the axes of said drying cylinders located in the lower row being substantially smaller in connection with a plurality of drying cylinders which are first in the direction of travel of the web than in the remaining part of the dryer, said web having a smaller free run between said closer spaced planes than between said further spaced planes in order to reduce the detriments arising from the fluttering of the web at said free runs, which fluttering causes the risk of wrinkling and rupture of the web, said greater distance being fixed so that the dryer has in respect to the length of said longer runs and geometry of said pockets a maximum drying effect.

4,075,769

METHOD AND ARTICLE FOR WEIGHT REDUCTION

Julius Young, 2759 Mackintosh, Bloomfield Hills, Mich. 48013

Filed Aug. 25, 1975, Ser. No. 607,213
Int. Cl.[2] G09B *19/00*
U.S. Cl. 35—1 **3 Claims**



1. In a weight reduction method, the steps of providing a plate having a relatively large area marked off for a meal and at least one small adjacent measuring area, picking up a portion of the meal such as meat, potatoes or peas with a utensil, matching said portion against said measuring area, reducing the quantity of said portion if necessary by removal of part of said portion until the portion is no larger than the measuring area, and ingesting the portion as so reduced.

4,075,770

METRIC SYSTEM TEACHING AND MEASURING DEVICE

Deryl L. Lill, 107 San Marcos, Fenton, Mo. 63026

Filed Feb. 4, 1976, Ser. No. 655,095
Int. Cl.[2] G09B *19/02*; G01N *9/00*
U.S. Cl. 35—30 **8 Claims**

1. A device for teaching and use of metric measurements comprising an elongated tube having opposed open ends, said tube having a uniform cross-section area of 10 square centimeters and a length of one meter, means for closing said tube at a first end, a scale extending from said first end to a second open

end, said scale starting at zero at the first end and ending at 100 centimeters at the second open end whereby the tube may be used as a linear measure and a volumetric measure to indicate volume in milliliters at scale measurements in milliliters when

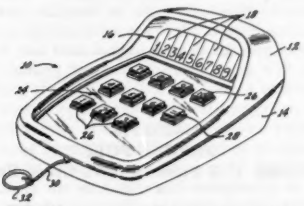
filled with liquid, the first end of the tube being closed by a member having a flat base extending beyond the sides of the tube whereby the tube may be supported in an upright position on a horizontal surface, said member having a socket receiving said first end in fluid sealing relationship.

4,075,771

TOY SIMULATING A CALCULATOR

Edmund Emil Landsinger, Torrance; Richard Shih-Teng Chang, Rolling Hills Estates, and William Joseph Gross, Rancho Palos Verdes, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 12, 1977, Ser. No. 758,597
Int. Cl.[2] G09B *19/02;* **A63H** *33/30*
U.S. Cl. 35—31 R **20 Claims**



1. In a toy, the combination comprising:
a housing having a display window;
a strip mounted within said housing, said strip having a plurality of stations, each of said stations having indicia viewable through said display window;
a keyboard mounted on said housing, said keyboard having an actuating key and a plurality of indicating keys equal in number to the number of said stations, each of said indicating keys having indicia thereon corresponding to a predetermined one of said stations;
manually operable means for removing all of said stations from said display window; and
means within said housing operatively coupling said manually operable means, said keyboard and said strip for permitting a preselected one of said stations to appear at a predetermined location in said display window upon sequential depression of one of said indicating keys and said actuating key.

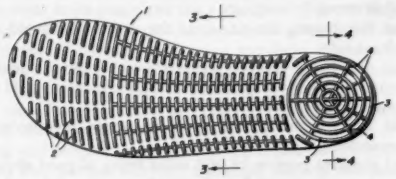
4,075,772

INSOLE FOR FOOTWEARS

MariaRosa Sicurella, Parabiago, Milan, Italy, assignor to Amilcare Cavalieri, Italy

Filed Apr. 21, 1975, Ser. No. 569,620
Int. Cl.[2] A43B *13/38*
U.S. Cl. 36—43 **4 Claims**

1. An insole for human footwear having defined thereon a first area corresponding to the heel of the foot and a second area corresponding to the remaining part of the foot, said first area having a plurality of upwardly protruding concentric rings of varying height to accommodate the anatomical form of the heel, and said second area having a plurality of upwardly protruding tabs of varying height each positioned substantially



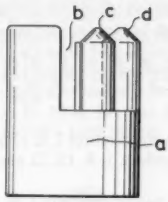
transversely to the longitudinal axis of the sole and aligned in rows parallel to said axis, the height of the tabs defining a bearing surface to accommodate the anatomical configuration of the foot.

4,075,773

SHEET-SUPPORTING DEVICE

Oskar Däster, Oltnerstrasse 125, 4663 Aarburg, Switzerland

Filed May 5, 1975, Ser. No. 574,714
Claims priority, application Switzerland, May 9, 1974, 6468/74
Int. Cl.[2] G09F *3/18*
U.S. Cl. 40—11 R **7 Claims**



1. A device for interchangeably supporting sheets in an upright position, particularly for displaying menu cards and the like, comprising a horizontal base and wall portions projecting vertically upwardly from said base and defining three vertically extending sheet-contacting surfaces, said wall portions comprising a first curved wall portion having opposite end portions defining two of said sheet-contacting surfaces located in one plane, the third of said sheet-contacting surfaces being located intermediate said two sheet-contacting surfaces equally spaced from said end portions and displaced in a direction normal to said plane so that a sheet inserted between said sheet-contacting surfaces is flexed and its rigidity increased in the longitudinal direction of the flexure.

4,075,774

PERPETUAL CALENDAR

Bernard L. Day, 6300 Washington Ave., Erie, Pa. 16509

Filed Jun. 4, 1976, Ser. No. 692,723
Int. Cl.[2] G09D *3/10*
U.S. Cl. 40—109 **1 Claim**

1. A calendar comprising a first sheet and a second sheet,
means holding said first sheet and said second sheet together,
seven vertical rows of six holes in each row in said first sheet,
said holes in said vertical rows being disposed in six horizontal rows,
each said vertical row having a day of the week printed above it,
seven slides, each said slide positioned behind one of said

vertical rows and sandwiched between said first and second sheets, said slides being frictionally held in position,

said second sheet extending above said first sheet a substantial distance and an opening in the upper part of said second sheet and a disc having its center supported on said first sheet,

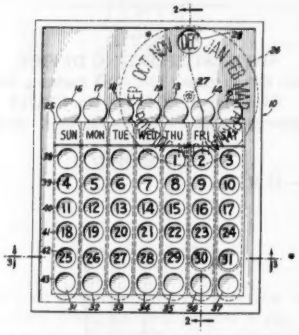
said disc having the names of the months arranged on its front side,

said disc being adapted to be rotated about its center to successively display the name of each month in said opening in said second sheet,

said slides each terminating in an upper end having the rounded portion thereon,

said rounded portion of said slides being aligned above the upper end of said first sheet when said numbers on one side of said slides are displayed in said openings in said first sheet,

said rounded portions being adapted to be grasped by a hand to facilitate moving said slides,



first said slide having numbers 1, 8, 15 and 22 on the one side thereof and numbers 1, 8, 15, 22 and 29 on the back side thereof,

second said slide having numbers 2, 9, 16 and 23 on the first side thereof and number 1, 8, 15, 22 and 29 on the back side thereof,

third said slide having numbers 3, 10, 17 and 24 on the first side thereof and numbers 3, 10, 17, 24 and 31 on the back side thereof,

fourth said slide having numbers 4, 11, 18 and 25 on both sides thereof,

fifth said slide having numbers 5, 12, 19 and 26 on both sides thereof,

sixth said slide having numbers 6, 13, 20 and 27 on both sides thereof,

seventh said slide having numbers 7, 14, 21 and 28 on both sides thereof.

4,075,775

LIGHT DIFFUSER AND ILLUMINATING CEILING DISPLAY

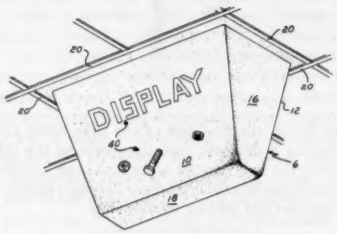
Richard A. Shorette, Crest Road, Monson, Mass. 01057

Continuation-in-part of Ser. No. 530,985, Dec. 9, 1974, abandoned. This application Jun. 28, 1976, Ser. No. 700,221

Int. Cl.[2] G09F *13/00*

U.S. Cl. 40—553 **1 Claim**

1. In combination with a suspended ceiling having generally rectangular ceiling tiles supported on a framework of mutually perpendicular support bars having a horizontal flange portion, one or more light sources disposed above the plane of the support bars at one or more spaced locations, at least one of said ceiling tiles below said light sources being removed for environmental illumination of the area in which the suspended ceiling is located, a visual display and a light diffuser for said area comprising an integral hollow body of translucent sheet material, said body having an upward opening, an outwardly extending annular rim portion dimensioned to supportively engage said support bars arranged about the periphery of one of said light sources, said body with the exception of said upward opening being continuous and wholly enclosing the illumination from said light source, said body diffusing said illumination and having a visual display thereon which is illuminated by said light source, said body is a thermoformed synthetic plastic material which is resiliently flexible enabling



substantial flexure of said body and in which said rim portion is severable to reduce its width, said translucent body includes side wall portions which extend downwardly a substantial distance from said rim portion one of said side wall portions being inclined toward the other, said visual display being disposed on at least one of said side wall portions, said rim portion before being severed is of a width substantially greater than the horizontal flange portion of the support bars of said suspended ceiling.

4,075,776

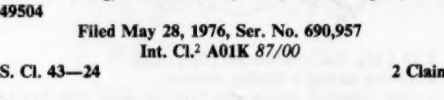
JIGGING POLE

Robert J. Fiebig, 1818 Fremont, NW., Grand Rapids, Mich. 49504

Filed May 28, 1976, Ser. No. 690,957

Int. Cl.[2] A01K *87/00*

U.S. Cl. 43—24 **2 Claims**



1. A jigging pole for fishing comprising:

a curved, stiffly resilient wooden rod shank of rectangular cross section and having handle means at one end and an integral line guiding eyelet formed through said shank at the opposite tip end; said shank being curved only at the tip half of the shank such that said tip end is oriented at an acute angle to the horizontal; said integral line guiding eyelet comprises an aperture formed through said rod shank at an angle to the longitudinal axis of said shank which is generally complementary to said acute angle such that line extending through said aperture will depend vertically from said rod shank when said handle means is horizontally disposed;

line guiding means located on top of said shank whereby fishing line is supported on said solid upper surface of said shank; and

wherein said handle means comprises a pair of gripping members overlaying said rod shank on opposite sides at said one end and co-extensive with a portion of said rod shank.

4,075,777
BAIT CASTING FLOAT

Robert D. Dalton, 3819 Maryland Drive, Doraville, Ga. 30340

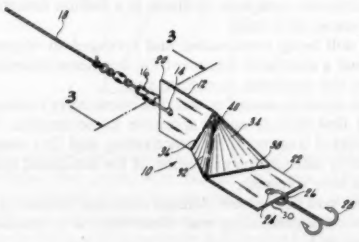
Filed Jul. 16, 1976, Ser. No. 705,788
Int. Cl.[2] A01K *97/04*
U.S. Cl. 43—41.2 2 Claims

1. A combination bait casting and fishing float comprising an elongated thin walled tube adapted to be closed at the distal end and open at the proximal end, said tube being divided into a bait cup section and a float chamber section, the proximal end of the said tube being flared outwardly with respect to the longitudinal center line of said tube to form a lip, aperture means in the wall of said cup section tube adapted to admit a fishing line therethrough, said aperture means further comprising an air vent adapted to allow discharge of entrapped air within the cup section to escape to the ambient atmosphere, the distal end of said tube having a retaining ring integral therewith, said retaining ring being formed in the wall of said tube and projecting through said wall to form a retaining dimple within the interior of said tube, said retaining dimple disposed about the entire interior circumference of said tube, the distal end of said tube forming the float chamber section, said float chamber section comprising a housing of the same tubular configuration as the said tube and terminating in a rounded nose, the rounded nose having an aperture therethrough from which there projects an elongated closed ended tube along the axial center line of the fishing float and whose diameter is substantially less than that of the bait cup section, floatation means retained within the float chamber section by means of the retaining ring and so positioned against the rounded nose so as to block the aperture to the elongated close-ended tube thereby forming a dead air space within said close-ended tube, said floatation means being a spherical ball.

4,075,778
FISHING LURE

Charles R. Howard, 404 Newcomb St., Whitewater, Wis. 53190

Filed Sep. 8, 1976, Ser. No. 721,553
Int. Cl.[2] A01K *85/01*
U.S. Cl. 43—42.31 6 Claims

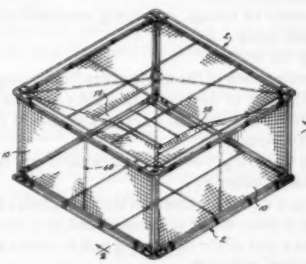


1. A fish lure formed of an elongated rectangular strip of material, said lure having planar leading and trailing end portions located at opposite ends of a central axis of elongation of said strip, said end portions being trapezoidal in shape, the planes in which said leading and trailing end portions lie being parallel to the axis of elongation, the projection of the leading end portion in its plane and the projection of the trailing end portion in its plane intersecting at a point removed from the central axis of the strip and being angularly displaced from each other by an angle of 90°, the medial portion of said lure being comprised of a pair of generally planar triangular sections, one of said triangular sections being contiguous with said leading end portion and being bent out of the plane of said leading end portion along a first sharp crease common to said leading end portion and said triangular section, the other of said triangular sections being contiguous with the trailing end portion and bent out of the plane of said trailing end portion along a second sharp crease common to said trailing end portion and said other triangular section, said triangular sections being joined along a third sharp mutual crease, said third crease converging toward opposite sides of said strip of material forming said lure, said first and second creases lying nonparallel to the forward and rear edges of said rectangular strip of material by an amount commensurate with the convergence with said third crease for forming said trapezoidal leading and trailing end portions, the bends occurring at first, second and third creases, when taken with the angular orientation of said creases in said strip being sufficient to establish the aforesaid relationship of said leading and trailing end portions, said leading end portion having means for connecting said lure to a fishing line and said trailing end portion having means for connecting a fish hook to said lure.

4,075,779
CRAB POT

Theodore T. Olafson, Box 251, Kodiak, Ak.

Filed Jun. 21, 1976, Ser. No. 697,880
Int. Cl.[2] A01K *69/08*
U.S. Cl. 43—100 15 Claims



1. A multi-component crab trap adapted to be stripped down to its respective components for storage, comprising a pair of spaced quadrilateral closure members which are superposed over one another with corresponding edges thereof oriented in substantially the same directions, and have spaced posts removably interposed therebetween, adjacent corresponding corner portions thereof, said posts having pairs of angularly spaced arms thereon, adjacent the respective ends thereof, and said arms extending substantially on parallels to the edges of the closure members at the respective corners thereof, and there being releasable clamping means interconnected with the respective arms and closure members on opposite sides of the posts to integrate the posts and closure members in the form of a cage having openings about the sides thereof in the spaces between the members and the posts, normally open crab entry means including tunnel rings attached to the cage adjacent openings on opposite sides of the cage, and having relatively inclined entry tunnels extending therebetween within the cage, which open into the interior of the cage, normally closed

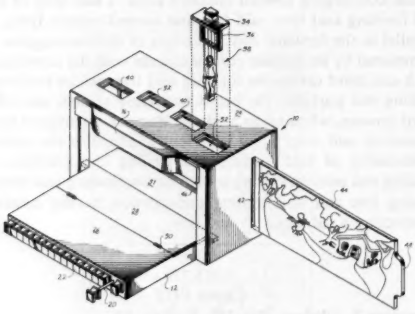
operator entry means attached to the cage adjacent one of the remaining openings in the same, and closure means attached to the cage adjacent the balance of the openings, to close the periphery of the cage to the movement of crabs, so that crabs entering the cage through the tunnels, remain trapped therein, the crab entry means, operator entry means, and closure means, being removably interposed in the spaces between the members and the posts, so that on detaching the posts from the members, and removing the crab entry means, operator entry means, and closure means, the members can be stacked on top of one another in a pile.

4,075,780

MARIONETTE ACTUATION

David T. Linebaugh, 7110 Sante Fe, Houston, Tex. 77061

Filed Oct. 21, 1976, Ser. No. 734,551
Int. Cl.[2] A63J *19/00*; A63H *7/00*
U.S. Cl. 46—13 **15 Claims**



1. The method of actuating marionettes on a stage, each marionette having
   a. movable parts with
   b. a plurality of strings, one string attached to each of the movable parts,

comprising the steps of:
   c. suspending each of the marionettes from a suspension unit,
   d. inserting one of the suspension units into the stage,
   e. manipulating individual keys on a keyboard on the stage, thus individually
   f. raising the strings below the suspension unit responsive to the manipulation by
   g. moving a striker mounted on the stage from a first position which is clear of the suspension unit to a second position against a part of the suspension unit to raise a string on the suspension unit, and
   h. removing and replacing one of the suspension units, thus changing a marionette.

3. In a marionette assembly adapted to be placed into a stage of same, said assembly having
   a. a marionette with movable parts,
   b. a plurality of strings, one string attached to each of the movable parts;

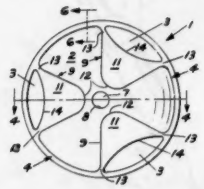
the improved structure for holding the strings to be manipulated comprising:
   c. a top plate to which the strings are attached and
   d. a bottom plate
      (i) attached to the top plate,
      (ii) spaced below the top plate and
      (iii) having a plurality of holes spaced therethrough,
   e. said top and bottom plates forming a suspension unit,
   f. each of said strings extending through one of the holes so that lateral displacement of the string will be translated into vertical displacement of the string below the bottom plate, thereby actuating the moving parts of the marionette.

4,075,781

FLYING DISK

Richard D. Hill, II, 2933 Mun Pier Road, Shreveport, La. 71119, and Carl T. Mastronuzzi, Jr., 1163 Gilbert St., Bossier City, La. 71112

Filed Jan. 10, 1977, Ser. No. 758,077
Int. Cl.[2] A63H *27/00*
U.S. Cl. 46—74 D **11 Claims**



1. A flying disk comprising a generally saucer-shaped hull having a convex upper surface, a concave lower surface, and a rim defining the peripheral outer edge of said hull; a central port or opening defined by a central port tube extending through said hull downwardly from said concave lower surface, the bottom end of said tube in planar relationship with the bottom edge of said rim; three cupped airfoils mounted in spaced relationship on said rim and on said concave lower surface, and each having a convex top surface and a concave bottom surface narrowing to form a tip, said tip of said airfoils projecting toward said central port tube; and three side ports disposed in spaced relationship in said hull adjacent said rim and defined by said rim and said airfoils.

4,075,782

DOLL SHOWING SICKNESS, AND MEANS FOR "CURING"

Joseph J. Neuschatz, 42 Old Homestead Road, Port Jefferson, N.Y. 11777

Filed Nov. 25, 1975, Ser. No. 635,031
Int. Cl.[2] A63H *13/00*
U.S. Cl. 46—118 **8 Claims**

1. A doll and, in combination therewith,
first means mounted in said doll for exhibiting simulation of an objective symptom of illness in a fashion detectable by the senses of a child,
   the doll being constructed and arranged to accommmodate a simulated treatment for the illness characterized by the simulated symptom; and
second means mounted in said doll operatively connected to said first means, and responsive to occurrence of said simulated treatment, for deactivating said first means and thereby causing the exhibition of the simulated symptom to at least diminish;
wherein said first means includes electrical resistance heater means for generating heat observable as a simulation of fever; and
said second means comprises switch means connected to said resistance heater means to deactivate the same when said

switch means is actuated as a result of occurrences of said simulated treatment and includes a member movable between a first position adjacent an orifice in the doll wherein said first means is activated and a second position away from said orifice wherein said first means is deactivated;

and wherein said combination further comprises a simulated thermometer having relatively movable means therein insertable into said orifice and responsive to the presence of said member in said first position to indicate a simulated fever condition.

4,075,783

BEE ATTRACTING COMPOSITION AND METHOD OF USE

Ivor R. Burden, Aptos, and George W. Reilly, Clovis, both of Calif., assignors to Custom Chemicides, Inc., San Leandro, Calif.

Filed Jun. 21, 1976, Ser. No. 698,154
Int. Cl.[2] A01G *7/00*
U.S. Cl. 47—1.41 3 Claims

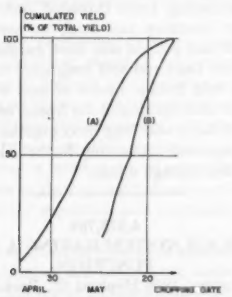
1. A method for increasing the productivity of a crop area requiring honey bee pollination, comprising the step of spraying an aqueous bee attracting spray composition over the crop area during the blooming period in sufficient quantity to attract bees and to maintain them in the crop area for pollination, said bee attracting composition comprising a dilute aqueous dispersion of about 10 to 25% by weight milk protein, about 60 to 75% by weight sugar, and wetting and dispersing agents for said milk protein.

4,075,784

METHOD FOR INCREASING THE PRODUCTIVE YIELD OF CROPS WITH POLYOLEFIN FILMS

Jean-Philippe Pied, Verneuil en Halatte, France, assignor to Societe des Plastiques de Carmaux Scasar, Saint Benoit de Carmaux, France

Division of Ser. No. 611,815, Sept. 8, 1975. This application May 19, 1976, Ser. No. 687,882
Int. Cl.[2] A01G *7/00*
U.S. Cl. 47—9 16 Claims



1. In a method for increasing the productive yield of crops by covering the crops with plastic film, the improvement comprising retaining heat by covering said crops with a polyolefin film containing from about 1 to 15% based on the weight of the polyolefin of an essentially dehydrated kaolinite containing from about 51 to 57% by weight silica, 40 to 46% by weight alumina and less than 3% impurities.

4,075,785

METHOD FOR HYDROPONIC GROWING OF LETTUCE

John L. Jones, San Angelo, Tex., assignor to CanDu, Inc., Glendale, Ariz.

Continuation of Ser. No. 297,323, Oct. 13, 1972, abandoned. This application Jan. 8, 1975, Ser. No. 539,498
Int. Cl.[2] A01G *31/02*
U.S. Cl. 47—64 4 Claims

1. A method for growing lettuce from seeds to commercial maturity, comprising:

a. implanting a lettuce seed within a porous root-permeable shaped support body;

b. moistening said shaped support body until said seed germinates, the stem and leaves of said lettuce plant growing generally upwardly therefrom and the roots of said lettuce plant growing through and outside said support body and generally outwardly and downwardly therefrom;

c. positioning said shaped support body and lettuce plant growing therein for application of a hydroponic nutrient solution to the lettuce plant roots growing outside and outwardly and downwardly from said support body and for application of actinic radiation to the lettuce plant foliage;

d. periodically

1. feeding said lettuce plant by applying hydroponic nutrient solution to the roots growing outside and depending outwardly and downwardly from said shaped support body, and

2. exposing said lettuce plant foliage to actinic radiation,

at least until said plant reaches commercial maturity;

and

e. harvesting said commercially mature plant prior to bolting by removing said plant from the growing position without separating said support body and roots growing therethrough from said commercially mature plant, and enclosing said shaped body and at least a portion of said plant in a vapor-barrier integument.

4,075,786

CONTAINER FOR SAFELY RETAINING A LIVING PLANT DURING TRANSIT AND DISPLAY

Bernard van Zyl, 105 Pineneedle Lane, Altamonte Springs, Fla. 32701

Filed Jul. 23, 1976, Ser. No. 708,271
Int. Cl.[2] A01G *9/02*
U.S. Cl. 47—84 13 Claims

1. A shipping and display arrangement for a small rooted plant comprising:

a. a box of transparent material having separate top and bottom portions, said portions each being equipped with interfitting edge members.

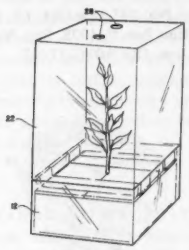
b. planting material as well as the roots of the plant, disposed in the bottom portion of said box,

c. a pad covering the planting material, for retaining same in the bottom portion of the box,

d. at least one strip of tape for securing said pad to the bottom portion of said box, with the ends of said strip of tape extending out between said interfitting edge members,

e. the interception of said tape ends by said interfitting edge

members causing adherent portions of tape to adhere tightly to the bottom portion of the box, thus to prevent



displacement of the pad and the planting material during transit.

4,075,787

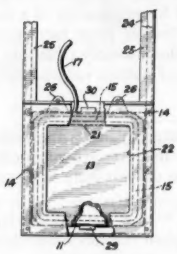
INFLATABLE POUCH TO SEAL

James B. Krahe, Erie, Pa., assignor to American Sterilizer Company, Erie, Pa.

Continuation of Ser. No. 592,920, July 7, 1975, abandoned. This application Nov. 17, 1976, Ser. No. 742,497

Int. Cl.[2] E05D *15/10*

U.S. Cl. 49—209 **2 Claims**



1. In combination, a chamber comprising a steam jacket having an inner shell and an outer shell terminating at an end in a door opening,

a plate-like flange fixed to said shells around said opening and said flange forming a closure for said steam jacket and presenting an outwardly directed surface,

an end frame fixed to said flange,

a sealing member on said flange on said outwardly directed surface extending entirely around said door opening,

said end frame being disposed outwardly in spaced relation to said flange and providing a space therebetween, said flange having an opening registering with said chamber opening,

a door member disposed between said flange and said end frame,

said door member comprising an outer door and an inner door defining a space therebetween and disposed in said space between said flange and said frame,

said inner door having laterally spaced guide pins along the lower edge thereof slidably engaging said outer door,

an inflatable pouch disposed between said outer door and said inner door and overlying said outer door and said inner door, and said opening and being substantially larger than said opening whereby the edges of said pouch extend outwardly beyond the flange defining said opening,

said pouch being adapted to be inflated whereby said outer door and said inner door are forced away from each other forcing said outer door against said frame and bringing said inner door into sealing engagement with said sealing member on said end flange and means for moving said door between said frame and said flange from a position overlying said opening to a position away from said opening,

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4,075,788

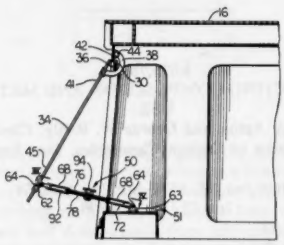
LINKAGE ASSEMBLY FOR A WINDOW

Howard R. Anderson, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 13, 1976, Ser. No. 750,095

Int. Cl.[2] E05F *11/00*

U.S. Cl. 49—324 **1 Claim**



1. In a window actuating mechanism comprising a frame having an opening therein with a flat deck extending laterally inwardly from one edge of said opening, hinge means fastened to an edge of said opening in the frame opposite to said edge with said flat deck, said hinge means hingedly mounting said window on said frame in closing relation to said opening, and linkage means extending between said panel and the deck on said frame, a pair of mounting members at each end of said linkage means with each mounting member having a pivot axis lying parallel to the axis of the hinge means of said window to said frame, one of said mounting members being mounted on said window and the other of said mounting members being mounted on said flat deck, a pair of short links pivotally mounted to each one of said mounting members for pivotal movement about an axis perpendicular to the pivot axis of said mounting members, a pair of long links crossing each other at the midportion of each long link and having one end portion of each long link pivotally connected to one end portion of one of said short links, each said last-named pivotal connection having an axis lying parallel to the axis of said pivotal mounting of said short links to said mounting members, a pivot passing through the crossover midportions of said long links, and a locking and actuating knob threaded onto said last-named pivot whereby loosening said knob on said pivot makes it possible to push and pull on said knob parallel to a plane containing said short links and said long links for elongating and foreshortening said linkage means as said window is opened and closed over said opening in the frame, and whereby tightening said knob locks said long links together thereby locking the linkage means and preventing further elongation or foreshortening of said linkage means.

4,075,789

ABRASIVE BLAST SYSTEM HAVING A MODULATION FUNCTION

George H. Dremann, 1940 Hopkins St., Berkeley, Calif. 94707

Filed Jul. 19, 1976, Ser. No. 706,510

Int. Cl.[2] B24C *3/00*

U.S. Cl. 51—436 **33 Claims**

1. An abrasive flow control valve for regulating the flow of abrasive media to the blast nozzle of an abrasive blast system comprising, in combination,

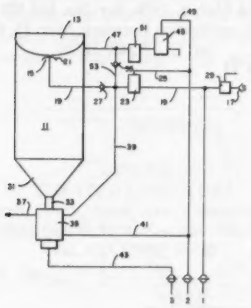
a housing having a first and second chamber formed therein, said first chamber having at least one abrasive media inlet port and at least one abrasive media outlet port, and said

second chamber adapted to pneumatically communicate with a remotely controllable air supply,

a reciprocable plunger assembly extending between said first and second chambers and having first and second ends, the first end of said plunger assembly being disposed to be reciprocated in relation to said abrasive media inlet port for regulating the flow of abrasive media therethrough, the second end of said plunger assembly having a deflectable wall fixedly secured thereto, said deflectable wall forming one of the walls of said second chamber and being adapted to move said plunger assembly for opening said abrasive media inlet port when said second chamber is pressurized by said remotely controllable air supply,

means for sealing said plunger assembly to said housing substantially where said plunger assembly passes between said first and second chambers whereby pneumatic integrity is maintained therebetween, said sealing means being adapted to substantially prevent air pressure on said sealing means from being transmitted to said plunger assembly,

means for biasing said plunger assembly to a position for keeping said abrasive media inlet valve closed, the biasing force of said biasing means being chosen so that it can be



overcome by normal operating pilot pressure in said second chamber,

air inlet means for permitting air to be introduced under pressure into said first chamber for propelling abrasive media flowing in through said abrasive media inlet port out through said abrasive media outlet port, and

means for modulating the position of said plunger assembly with respect to said abrasive media inlet port when said second chamber is pressurized whereby the flow of said abrasive media in th.ough said abrasive media inlet port can be selectively regulated, said modulation means comprising

a variable pressure chamber formed in said housing adjacent said second chamber and having said deflectable wall of said second chamber in common therewith, said deflectable wall being of a relatively large size in relation to the dimensions of said second chamber whereby movement of said plunger assembly is substantially controlled by said deflectable wall by the relative pressures in said second chamber and variable pressure chamber, and

modulating air pressure inlet means for controllably pressurizing said variable pressure chamber for modulating the position of said plunger assembly.

4,075,790

SCREW THREAD TAP GRINDING WITH AUTOMATIC LOADING MEANS

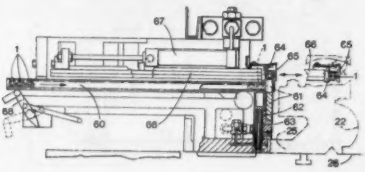
Raymond Leslie Palmer, Solihull, England, assignor to Coventry Gauge & Tool Company Limited, England

Division of Ser. No. 577,424, May 14, 1975, Pat. No. 3,994,099, which is a continuation of Ser. No. 349,623, Apr. 9, 1973, abandoned. This application Nov. 23, 1976, Ser. No. 744,272

Claims priority, application United Kingdom, May 6, 1972, 21227/72

Int. Cl.² B24B *3/18*

U.S. Cl. 51—94 CS **1 Claim**



1. Screw thread tap grinding apparatus comprising a support mountable in a grinding machine in relation to a thread grinding wheel of the latter for relative transverse of said support and grinding wheel, the support carrying headstock and tailstock means for rotatably receiving a tap workpiece between a centre of a driving centre spindle of the headstock and a centre of the tailstock whereby a said tap workpiece received therebetween is mounted in relation to a said grinding wheel for grinding thereby; operating means for effecting axial retraction of at least one of said centres relative to the other for obtaining release and discharge of a ground tap workpiece from between said headstock spindle centre and tailstock centre; a magazine for receiving uniformly arranged tap workpieces to be ground for sideways sliding feed movement therealong and axially parallel with the axis of said centres; a lifter member for receiving a tap workpiece directly thereon as it issues from the magazine and operable for raising a said tap workpiece supported thereby, a transfer holder having a spring latch for receiving and holding a said tap workpiece raised therein by the lifter member, said transfer holder being operable for operative movement in order to position a said tap workpiece to be ground between said centres for holding thereby on relative axial return movement of the centres, the spring latch being yiedable so as to ride over the said tap workpiece when the latter is held between the centres in order to permit empty return movement of the transfer holder.

4,075,791

AUTOMATIC COPYING BELT GRINDING MACHINE

Sakae Koide, Tokyo; Shigeo Aoki, Habikino, and Tetsutaro Uematsu, Fuchu, all of Japan, assignors to Tahara Shoyei Kiko K.K., Tokyo and Hoshiden Electronics, Co., Ltd., Osaka, both of, Japan

Filed Nov. 13, 1975, Ser. No. 631,659

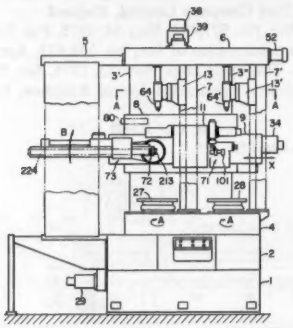
Claims priority, application Japan, Nov. 14, 1974, 49-131779

Int. Cl.² B24B *21/02, 17/00*

U.S. Cl. 51—142 **1 Claim**

1. An automatic copying belt grinding machine, comprising a Z-axis slide movable in a vertical direction, an X-axis slide slidably mounted on said Z-axis slide to shift horizontally, a swivelling grinding head mechanism mounted on said X-axis slide, a duplex electronic copying sensor having a portion for sensing the contour of a model and a swivelling portion for sensing the inclination of a surface of said model mounted on said X-axis slide, a pair of fixture tables rotatable in synchronization with each other upon which a model related to the duplex electronic copying sensor and a workpiece related to said swivelling grinding head mechanism are respectively vertically installed, and an electronic control unit for controlling said Z-axis slide and said X-axis slide and said copying

sensor and said grinding head so that they function in a copying mode, whereby the grinding machine copy grinds the workpiece continuously and spirally along the peripheral direction over its entire length, while the tangential speed of the grinding head relative to the workpiece is kept constant and the grinding head is positioned normal to the surface of the workpiece at the point of contact.

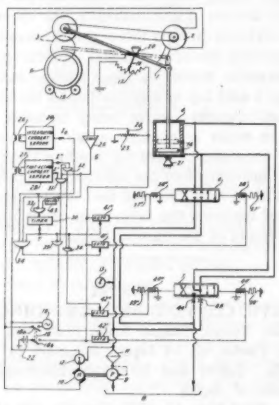


4,075,792

SYSTEM FOR CONTROLLING THE ADVANCE OF A ROTARY MACHINE TOOL

Jürgen Schreiber, Wetzlar, Germany, assignor to Buderus'sche Eisenwerke Aktiengesellschaft, Wetzlar, Germany

Filed Apr. 15, 1976, Ser. No. 677,121
Claims priority, application Germany, Apr. 17, 1975, 2517001
Int. Cl.[2] B24B *47/06*
U.S. Cl. 51—165.92 **2 Claims**



1. A system for machining a workpiece, comprising:

a workpiece holder;

a rotary machine tool engageable with a workpiece on said holder; p1 a support for said tool movable relatively to said holder for advancing said tool toward said workpiece;

an electric motor coupled with said tool for rotating same about an axis;

current-sensing means in circuit with said motor;

a reversible hydraulic servomotor linked with said support and provided with a high-rate fluid-supply circuit including a first valve and with a low-rate fluid-supply circuit including a second valve, each of said valves having a forward-flow position, a neutral position and a reverse-flow position;

control means responsive to said current-sensing means for placing said first valve in its forward-flow position to advance said tool rapidly toward the workpiece under low-current conditions during an approach phase and for actuating said second valve while maintaining said first valve in its neutral position to displace said tool more slowly under high-current conditions, indicative of an engagement of the tool with the workpiece, at speeds tending to maintain the motor current in a predetermined range during a working phase following said approach phase, with reversal of the flow in said low-rate fluid-supply circuit upon detection of an overload condition by said current-sensing means; and

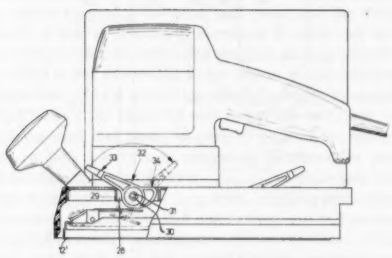
switchover means responsive to a predetermined advance of said tool from a starting position for modifying the operation of said control circuit to hold said second valve in its neutral position while shifting said first valve into its reverse-flow position upon a recurrence of said low-current conditions due to severance of the workpiece for rapidly retracting said tool to said starting position in a withdrawal phase following said working phase.

4,075,793

POWER SANDER

Eberhard Vogel, Dettenhausen; Herbert Glaser, Leinfelden; Albert Kleider, Waldenbuch, and Klaus Dietz, Musberg, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

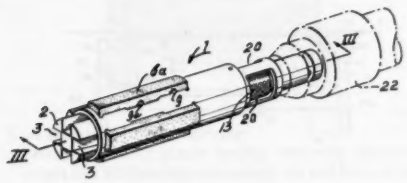
Filed Mar. 8, 1976, Ser. No. 664,808
Claims priority, application Germany, Mar. 15, 1975, 2511392
Int. Cl.[2] B24B *23/00*
U.S. Cl. 51—170 TL **8 Claims**



1. A power sander comprising, in combination, a support means including a casing having an axis, a circumferential wall surrounding said axis with spacing therefrom and having axially spaced ends, and a transverse wall at one of said ends and having at least one opening of predetermined dimensions, said walls bounding a space; a sanding body accommodated in said space and having a support surface at the other end of said circumferential wall; drive means mounted on said support means and operative for cyclically moving said sanding body in a plane which is normal to said axis; means for interchangeably attaching a sanding element to said sanding body so that the former is supported on and covers said support surface, including clamping means mounted on said sanding body for pivoting between an engaging position and a disengaging position, and biasing means urging said clamping means toward said engaging position; and actuating means including at least one actuating lever mounted in said opening of said transverse wall for pivoting about a pivot axis normal to said axis between a retracted position and an extended position and having an actuating portion accessible from the exterior of said casing, and a cam portion in said space which is operative for abutting against and pivoting said clamping means toward said disengaging position durng pivoting of said actuating lever toward said extended position, said actuating lever having such dimensions as to close said opening in said retracted position

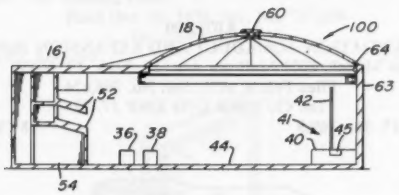
thereof to thereby prevent air from passing through said opening past said actuating lever during the operation of the sander.

4,075,794
HONING TOOL
John A. Blaylock, 7983 Blackshire Drive, Huber Heights, Dayton, Ohio 45424
Filed Apr. 6, 1976, Ser. No. 674,212
Int. Cl.[2] B24B 33/04; B24D 17/00
U.S. Cl. 51—340 9 Claims



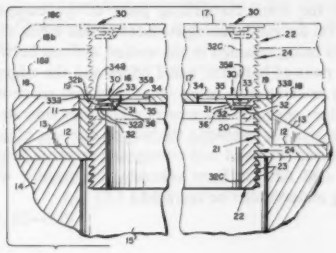
9. A longitudinally shaped honing element for use in a portable honing tool which honing element is wedge-shaped and has an abrasive section with an abrasive outer surface and also has a longitudinally shaped carrier member firmly connected to said abrasive section and provided on its longitudinal sides with longitudinally extending plane flat projections arranged between and in spaced relationship to the ends of said carrier member.

4,075,795
THEATER STRUCTURE
Anthony Thomas, 104 N. Ninth Ave., Coatesville, Pa. 19320
Filed Oct. 7, 1976, Ser. No. 730,562
Int. Cl.[2] E04H 14/00
U.S. Cl. 52—8 8 Claims



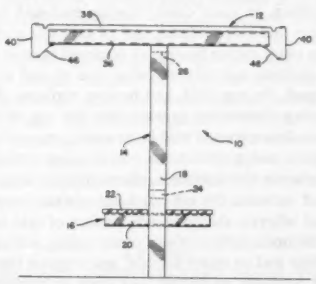
1. A theater structure, comprising:
a building provided with a driveway entrance for automobiles and a roof structure having a substantially flat portion and an openable dome structure;
a performance viewing area located at one end of the building;
an area in front of said performance viewing area for parking a plurality of automobiles whereby persons within said automobiles may view performances;
said openable dome structrue covering said automobile parking area which may be closed to keep out light and/or inclement weather and which may be opened during ambient darkness and fair weather conditions; and
a plurality of seats in front of said performance viewing area and behind said automobile parking area for persons to sit and view performances, said plurality of seats being under said substantially flat portion of said roof structure.

4,075,796
ADJUSTABLE HEIGHT MANHOLE WITH LOCKING MEANS
Benjamin D. Cuozzo, 15 Mackey Road, Garnerville, N.Y. 10923
Filed Mar. 25, 1977, Ser. No. 781,436
Int. Cl.[2] E02D 29/14
U.S. Cl. 52—20 5 Claims



1. An adjustable height manhole with locking means, comprising a hollow cylindrical and internally threaded main body having an annular base flange integral of the exterior of said main body, for supporting said main body within a ground opening, a hollow cylindrical, externally threaded sleeve rotatably received within said main body, providing adjustable elevation means for the top portion of said manhole, said sleeve having a cover removably received therein, said cover and said sleeve having adjacent openings removably receiving a spanner wrench, thus providing a means for raising and lowering said sleeve to various pavement levels, and said locking means comprising a pair of locking plates which are slidable in a pair of channel openings provided in said cover, said sleeve and said main body, so as to lock said cover and said sleeve against rotation within said main body at a first pavement level, said locking plates also including pin means integral therewith, which are removably received within opening means on the inner periphery of said sleeve, so as to lock and retain said cover in the top of said sleeve.

4,075,797
SHELTER CONSTRUCTION
James E. Shaw, Crown Point, Ind., assignor to White Advertising Company, Shelby, Ind.
Filed Sep. 13, 1976, Ser. No. 722,789
Int. Cl.[2] G09F 7/18; E04B 1/34
U.S. Cl. 52—36 8 Claims



1. In a shelter construction including a roof section, vertically disposed legs for supporting the roof section, and a vertical wall extending between said legs, said legs comprising vertical tubes having a rectangular cross section, horizontally disposed tubes having a rectangular cross section extending between said vertical tubes, said vertical and horizontal tubes defining a border or said wall, the improvement comprising

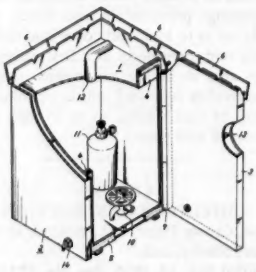
display means for advertising material and the like associated with the construction, said display means including a pair of transparent panels, and means for releasibly supporting said panels on a surface of said wall, said advertising material comprising separate sheets disposed between said panels and the respective wall surfaces, said means for releasibly supporting the panels comprising stops extending into engagement with panel edges whereby the stops resist any attempt to remove said panel, the stops comprising pairs of spaced-apart bars positioned on the inside facing surfaces of said tubes, the edges of said wall being retained in the spaced defined between the respective pairs of bars, the panel edges and the edges of the advertising material also being located in said space between the wall edges and the bars whereby said bars operate as said stops, and means for removing the bars on one side of said wall, said panels, said wall and said advertising material being unattached to said tube surfaces whereby the panels, wall and advertising material can be released.

4,075,798

WATER COOLING JACKET FOR FIRE

Michiji Tazaki, 3-3-46, Haraichi, Annaka, Gunma, Japan (379-01)

Filed May 10, 1976, Ser. No. 684,832
Int. Cl.[2] E04B *1/92*
U.S. Cl. 52—168 **8 Claims**



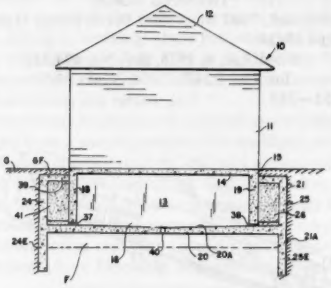
1. A water cooling jacket for the protection of persons from fire comprising, an inner casing having enclosed top and bottom surfaces and side surfaces, one of said side surfaces being opened, an outer casing having an enclosed bottom surface, an open top surface, and side surfaces, one of said side surfaces being opened, the top, side, and bottom surfaces of said outer casing having dimensions greater than the top, side, and bottom surface dimensions of said inner casing, means for supporting said inner casing within said outer casing so that a space is formed between the bottom surfaces of said inner and outer casing, and between the side surfaces of said inner and outer casing, and wherein the open side surface of said inner casing is within the open surface of said outer casing, a door having an inner surface and an outer surface, and a space therebetween, means for hingedly mounting said door to enclose the open side surfaces of said inner and outer casings, means within said inner casing for supplying water to the space between the inner and outer casing and to the space between the inner and outer surfaces of said door, and to the outside of the top surface of said inner casing, means for supplying air or oxygen into the inner casing and water cooling means for providing water to the outside side surfaces of said outer casing for cooling the outside side surfaces of said outer casing.

4,075,799

BUILDING INSULATION SYSTEM AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Aug. 30, 1976, Ser. No. 718,930
Int. Cl.[2] E02D *27/32;* **E04B** *1/64, 1/76*
U.S. Cl. 52—169.5 **20 Claims**



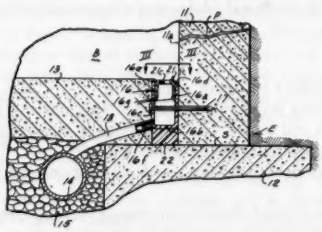
1. A building structure comprising in combination:
a building having a foundation portion including a subterranean vertical inner wall circumscribing a subterranean volume, such as a cellar, a floor disposed across said circumscribing inner wall and connected thereto near the bottom thereof, an outer wall circumscribing and spaced-apart from said inner wall and extending to at least the depth of said inner wall beneath the surface of the ground, said outer wall defining an annular volume with said inner wall, and a circumscribing top wall joining said outer and inner walls to enclose said annular volume, and a solid, air-entrapping insulating material disposed within and substantially filling said annular volume for retarding the transfer of heat between the volume located inwardly of said inner wall and the soil exterior of said outer wall.

4,075,800

FOUNDATION AQUADUCT AND EXPANSION JOINT

Medea Molick, 8001 Mulligan Ave., Burbank, Ill. 60459

Filed Feb. 9, 1977, Ser. No. 766,874
Int. Cl.[2] E04B *1/70;* **E04F** *17/00*
U.S. Cl. 52—169.5 **5 Claims**

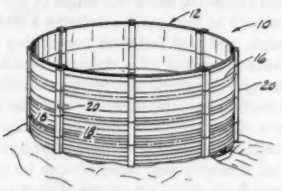


1. In combination with a building structure having a foundation wall supported on a footing and surrounding a floor, the improvement of an open top resilient duct, means mounting said duct on the inner face of the foundation wall with the top of the duct level with the top surface of the floor and surrounding the floor to act as an expansion joint between the foundation wall and the floor, and a drain for said duct at a lower level than the bottom of the duct.

4,075,801
STORAGE TANKS

Marc H. Alper, Creve Coeur, and Ernest J. Koestering, Kirkwood, both of Mo., assignors to Philip D. Mogler, Lester, Iowa

Filed Nov. 15, 1976, Ser. No. 741,962
Int. Cl.[2] E04H *12/16*
U.S. Cl. 52—196 **21 Claims**

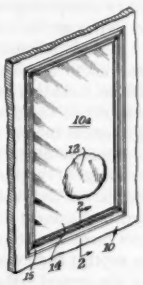


1. A tank structure comprising:
a plurality of wall panels having vertically extending end edges and horizontally extending top and bottom surfaces:
said wall panels being arcuate in horizontal cross section:
a plurality of vertical pilasters;
said wall panels being placed edge to edge with one of said pilasters located therebetween to form a substantially cylindrical tank wall;
a plurality of vertically spaced tensioned tendons on the exterior of said panels for prestressing said tank wall;
said wall panels being formed of a plurality of substantially-identical, vertically-stacked, precast-concrete wall panel sections, and said pilasters being formed of substantially-identical, vertically-stacked, precast-concrete pilaster sections; and,
each of said pilaster sections having a vertical height substantially equal to the height of said wall panel sections.

4,075,802
BURGLAR-PROOF WINDOW AND LIKE PANES OF GLASS

Marvin H. Gross, Northridge, and Alfred Kolb, Sherman Oaks, both of Calif., assignors to Transparent Glass Coatings Co., Inc., Los Angeles, Calif.

Filed Oct. 18, 1976, Ser. No. 733,138
Int. Cl.[2] E06B *3/28*
U.S. Cl. 52—203 **2 Claims**

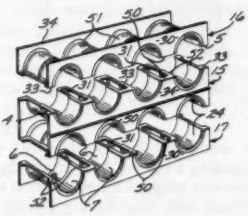


1. A burglar-proof window construction comprising:
(a) a circumscribing frame surrounding a window space and providing a circumscribing seat adjacent said window space;
(b) a window positioned in said window space and having its outer edges position positioned on said seat;
(c) a molding secured to said frame and providing a holding flange for securing said window in place;
(d) a strong transparent shatter-proof film having qualities to exclude ultra-violet light covering that portion of said window within said window space, the outer edge of said transparent film extending onto said molding on the side opposite from said glass; and
(e) an adhesive positioned between said window and said transparent film and edge of said transparent film and said molding, said adhesive securedly fixing said transparent film to said window, and the edge of transparent film to said molding, the securing of the edge of said transparent film to said molding restraining the edges of said transparent film from moving inwardly toward said window space.

4,075,803
SPLIT DUCT TERMINATOR

John Alesi, Jr., Topanga, Calif., assignor to Formex Manufacturing, Inc., Venice, Calif.

Filed Jun. 24, 1976, Ser. No. 699,507
Int. Cl.[2] E04C *1/39;* E04B *5/48*
U.S. Cl. 52—220 **6 Claims**



1. Split duct terminator apparatus for terminating a plurality of subterranean cables comprising a plurality of module members, each member including a pair of longitudinally extending upright opposing wall elements having at least one pair of mutually coextensive module interface edges which lie in a common laterally extending modular element interface plane that intersects said wall elements, a plurality of symmetrical longitudinally spaced parallel channel elements extending between said opposing wall elements and the edges of which lie in said modular element interface plane to define a plurality of spaced apart channels concave with respect to said modular element interface plane and wherein the longitudinal spacing between said channel elements defines symmetrical openings therebetween, and further including alignment projections uniformly spaced in the direction of spacing between said channel and extending outwardly from at least some of said modular members normal to said module interface plane, and which are received by corresponding recesses in others of said module members positioned adjacent thereto, whereby the disposition of modular members in face to face relationship with modular interface edges of the wall elements of each member in mutual contact and modular interface edges of channel element of each member in mutual contact and the provision of said alignment projections disposed within said recesses to laterally immobilize said modular elements relative to each other creates a composite structure having passageways formed by adjacent channels in said members and extending between the aforesaid wall elements.

4,075,804
FIRE RESISTANT ASBESTOS-FREE DOOR, PANEL OR BUILDING ELEMENTS, AND METHOD OF MANUFACTURE USING UNIQUE COMPOSITIONS

Herbert E. Zimmerman, Algoma, Wis., assignor to Champion International Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 437,727, Jan. 30, 1974, abandoned. This application Sep. 22, 1975, Ser. No. 615,727
Int. Cl.[2] E04C *2/00*
U.S. Cl. 52—232 **5 Claims**

1. A fire resistant door comprising a core framed within fire

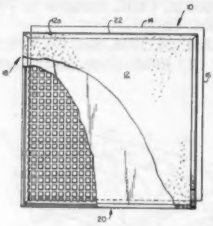
resistant stiles and rails, and wherein said core has veneer sheetings, said core having a composition consisting essentially of by weight calcium silicates in an amount within the range of 78.0 to 88.0 percentage; vermiculite, 7.5 to 10.0 percentage; sisal fibers 0.5 to 5.0 percentage; glass fibers 0.1 to 1.0 percentage; and moisture 2.0 to 15.0 percentage.

4,075,805

BUILDING PANEL WITH ATTACHED SEALING MEANS

John P. Bongiovanni, 19 Bates Road, Chester, Conn. 06412

Filed Feb. 23, 1977, Ser. No. 771,085
Int. Cl.[2] E04B *1/62*; E04C *1/10*
U.S. Cl. 52—309.12 **9 Claims**



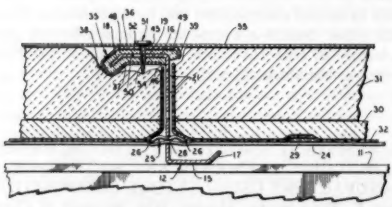
1. An exterior wall panel for assembly with other identical panels, and comprising a base of heat insulating material, said base having a rear face adapted for attachment to a wall structure or the like, and said base having a front face defining grooves, said base being of generally regular polygonal outline with at least two adjacent sides defining projecting edges and located adjacent the rear face of the base, said adjacent sides having portions adjacent the front face of the base which portions are of a thickness approximately equal to the thickness of said projecting edges, said panel edges opposite said adjacent edges defining undercut relieved cavities to receive the projecting edges of at least two adjacent panels, a polymer fortified cementitious facing on said grooved front face, and a strip of nonporous compressible foam type tape with adhesive on both sides applied to said adjacent two sides so that a paper peel-off strip may be provided on the outside of said foam tape to be peeled off after the panel has been attached to such wall structure and before the two adjacent panels are attached to said wall structure.

4,075,806

ROOF WITH INSULATED PURLIN

Robert Joe Alderman, 812 59th St., NW., Bradenton, Fla. 33505

Continuation-in-part of Ser. No. 494,097, Aug. 2, 1974, Pat. No. 3,969,863, and Ser. No. 638,329, Dec. 8, 1975. This application Jan. 5, 1976, Ser. No. 646,648
Int. Cl.[2] E04B *2/28, 2/60*
U.S. Cl. 52—403 **10 Claims**



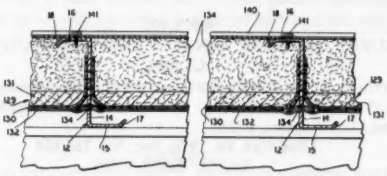
1. A roof structure comprising a plurality of rafters and the like oriented in spaced approximately parallel relationship with respect to one another, a plurality of purlins supported by said rafters in spaced approximately parallel relationship with respect to one another and extending across said rafters, each of said purlins including an upper laterally extending flange, sheets of hard roofing material and the like supported by the upper laterally extending flanges of said purlins, fasteners connecting said sheets of hard roofing material to the upper laterally extending flanges of said purlins, a strip of insulation material positioned in abutment with the lower surface of the upper flanges of said purlins and extending along the length of the purlins, and a strip of hard material supported by said purlin and juxtaposed the lower surface of the layer of insulation material and extending along the length of the purlins, the upper flange of each of said purlins defining a series of openings therethrough, and said fasteners comprising rivet members each including a shank of a diameter smaller than the openings in the upper flanges of said purlins extending from the sheets of hard roofing material down through the openings of the upper flanges of said purlins without contacting the purlins, and through the layer of insulation material and into the layer of hard material, whereby said fasteners can be inserted into the roof structure from above the sheets of hard roofing material without requiring access to the space below the sheets of hard roofing material.

4,075,807

METHOD AND APPARATUS FOR APPLYING SHEET MATERIAL TO A ROOF STRUCTURE

Robert Joe Alderman, 812 59th St. NW., Bradenton, Fla. 33505

Filed Jan. 16, 1976, Ser. No. 649,911
Int. Cl.[2] E04B *2/28, 2/60*; E04F *21/00*
U.S. Cl. 52—407 **20 Claims**



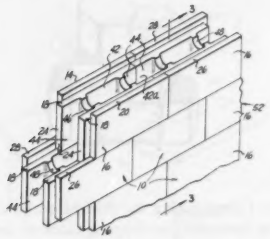
14. In a roof structure comprising a plurality of spaced rafters oriented parallel to one another, a plurality of approximately equally spaced purlins mounted on said rafters and oriented parallel to one another and perpendicular to said rafters, each of said purlins including an upwardly extending central web and oppositely laterally extending upper and lower flanges, the improvement therein of each of said purlins defining a plurality of openings along its length through its central web with the openings of the purlins spaced at varying heights in the web of the purlins and with the openings of each purlin being in approximate alignment with the openings of the purlins on opposite sides thereof, a plurality of support straps oriented parallel to one another and extending through aligned ones of the openings of the central webs of said purlins, elongated sheets of material of a width sufficient to substantially span the space between the central webs of adjacent ones of said purlins positioned between and extending parallel to said purlins and resting on said support straps and above the lower flanges of said purlins, sheets of roofing material mounted on said purlins and extending over said sheets of material, and loose insulation material of a thickness approximately equal to the height of the space between said elongated sheets of material and said sheets of roofing material supported by said sheets of material and substantially filling the space between said support straps and said sheets of roofing material.

4,075,808

BUILDING CONSTRUCTION SYSTEM USING MORTAR-LESS MODULAR BUILDING BLOCK ELEMENTS

Sanford Pearlman, 25218 Parkwood, Huntington Woods, Mich. 48060

Continuation of Ser. No. 527,088, Nov. 25, 1974, abandoned.
This application Apr. 28, 1976, Ser. No. 681,134
Int. Cl.[2] E04B *2/00, 5/48*
U.S. Cl. 52—439 **21 Claims**



1. A modular system of building construction comprising full blocks, half blocks, adaptor blocks, wall end blocks, corner blocks and wall junction blocks, each consisting of an interlocking block element comprising a main body portion vertically offset a predetermined substantially constant amount relative to a pair of opposed side slab portions integrally formed with said main body portion, said side slab portions being substantially mutually parallel and of equal dimensions, said main body portions being horizontally offset at least at one lateral end thereof relative to said side slab portions, whereby a plurality of said block elements are horizontally and vertically interlocked by overlapping stepped joints in surface to surface engagement when laid end to end in superimposed courses, each of said stepped joints being defined relative to a block element by at least a pair of edge surfaces disposed substantially one at right angle to the other, said main body portion of each block element being hollow and provided with at least one recess extending vertically from upper face to lower face of said main body portion and open to at least one lateral end of said body portion, said recess continuously extending horizontally and vertically behind said overlapping stepped joints and being adapted to receive mortar or cement poured within said wall structure for uniting each of said block elements with each other by allowing said concrete or cement to flow vertically and horizontally within said wall structure only and to set to a solid from whereby set mortar or cement is present within said wall structure behind each horizontal and vertical overlapping stepped joint forming an uninterrupted moisture, heat and wind barrier and said overlapping stepped joints forming a dam preventing seepage of mortar or cement through said joints to the exterior of said wall structure.

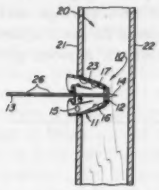
4,075,809

HOLE REPAIR DEVICE

Theodore M. Sirkin, 15401 Saticoy St., Van Nuys, Calif. 91406

Filed Jan. 2, 1976, Ser. No. 646,065
Int. Cl.[2] E04G *23/02*
U.S. Cl. 52—514 **1 Claim**

1. A device for use in repairing a hole in a hollow structure such as a wall, comprising an elastomeric concavo-convex circular member, said member having a plurality of holes therethrough, a plurality of radially extending ribs on the concave side of



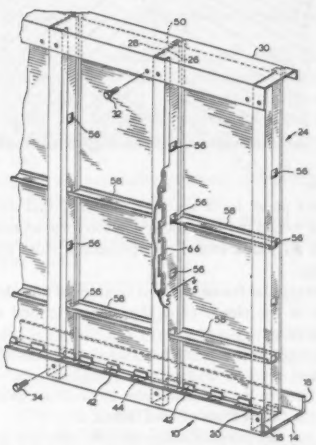
said member, said ribs terminating a substantial distance from the perimeter of said member.

4,075,810

METAL WALL CONSTRUCTION FOR BUILDINGS

Andrew Steven Zakrzewski, Burlington; Roderick William Eastman, Millgrove; George Steven Ashby, Port Credit, and Douglas Mel Clarkson, Brantford, all of Canada, assignors to Dominion Foundries and Steel, Limited, Burlington, Canada

Filed May 6, 1976, Ser. No. 683,767
Int. Cl.[2] E02D *27/00;* **E04C** *2/38*
U.S. Cl. 52—585 **8 Claims**



1. A metal building wall construction comprising:

a plurality of vertically-extending panels, each comprising a body portion having inner and outer faces and inwardly-extending edge webs at each vertical edge of the body portion, the panels being disposed side by side with their edge webs abutting, the said abutting panel edge webs having registering holes therein;

at least one of the said edge webs having formed therein a vertical ridge spaced from the adjacent inner panel face; and

at least one channel-section stiffening member for each panel extending between the two vertical edge webs of a panel for bracing the said abutting edge webs into contact with one another with a flange thereof engaging the inner face of the panel body portion for stiffening thereof against inwards bulging;

each stiffening member having one end shaped to fit within two registering edge web holes and to wedge against the immediately adjacent edge web in the neighbourhood of the respective web hole, and having its other end shaped to be engaged between the said vertical ridge in the other edge web of the same panel and the panel inner face upon displacement of the said other end of the stiffening mem-

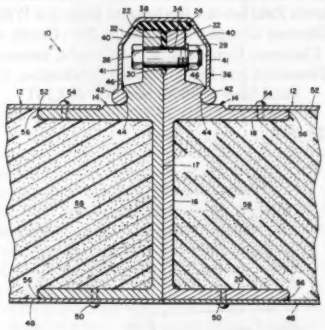
ber downward with its said one end engaged in the respective two registering holes, so as to be retained against the panel inner face by its engagement with the said registering apertures and vertical ridge, and so as to brace the engaged edge webs of its panel against the abutting edge webs of the immediately adjacent panels.

4,075,811

BUILDING ROOF PANEL

Donald B. Keith, Owasso, Okla., assignor to Nordam, Tulsa, Okla.

Filed Nov. 11, 1976, Ser. No. 740,865
Int. Cl.[2] F04D *3/36*
U.S. Cl. 52—395 **14 Claims**



1. A roof panel for a sectional building that can be transported and joined to other roof panels to form an extended area roof, with all joints sealed and protected from the weather, comprising:

(a) a rectangular frame made of sections of an extruded metal form, in the shape of a U channel, turned on its side, comprising:

(1) a base portion, which forms the outer surface of said frame,

(2) a bottom leg perpendicular to said base portion which forms the bottom of said frame;

(3) a top leg perpendicular to said base and spaced from said bottom leg by the width of said base portion, which forms the top of said frame;

(4) a support flange which forms a vertical extension of said base portion above said top leg; and

(5) means to attach lengths of said channel to each other to form a rectangular frame;

(b) a first rectangular sheet of metal of substantially the outside shape and area of said frame, and means to attach said sheet to the outside of said bottom legs of said frame;

(c) a second rectangular sheet of metal of the shape and area of the top of said frame inside of said upwardly extending flange, and means to attach said second sheet to the top surfaces of said top legs of said frame;

(d) means to fill the inside volume of said frame and said first and second sheets with a foamed plastic of selected composition; and

(e) a resilient gasket of T section, the leg portion being placed between abutting flange surfaces when two panels are placed edge to edge, the top portion covering the tops of the flanges and the joint; and

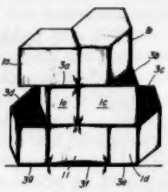
(f) means to press said two flanges together, compressing said gasket and sealing the joint between said two flanges.

4,075,812

REFRACTORY CHECKERWORK

Yasujiro Koyama, Yokohama; Fukuichi Kitani, Kawasaki, and Masaaki Nishi, Fukuyama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 5, 1975, Ser. No. 629,115
Claims priority, application Japan, Nov. 8, 1974, 49-128093
Int. Cl.[2] F23M *5/00*
U.S. Cl. 52—747 **6 Claims**



1. A method of determining the thickness of a compressible layer of material between overlapping faces of checker work bricks, comprising the steps of

(A) determining the compressibility of the material to be used in said layer;

(B) obtaining the amount of compressibility of said layer at 1.5 to 2.0 times the tensile strength of said bricks;

(C) measuring the maximum dimensional tolerance between overlapping bricks;

(D) determining the amount of compressibility required to disperse a maximum safety load throughout the maximum dimensional tolerance; and

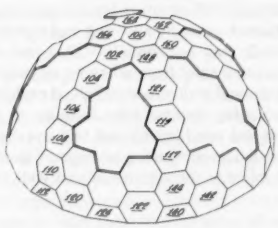
(E) letting the thickness of said layer equal the said dimensional tolerance times the said amount of compressibility required to disperse a maximum safety load divided by the said amount of compressibility at 1.5 to 2.0 times the tensile strength.

4,075,813

DOME CONSTRUCTION METHOD

David L. Nalick, 10789 Freer St., Temple City, Calif. 91780

Filed Jul. 14, 1976, Ser. No. 705,074
Int. Cl.[2] E04B *1/32*
U.S. Cl. 52—747 **8 Claims**



1. The method of building a dome structure comprising the steps of constructing a plurality of regular, identical, hexagonal structural units of rigid interconnected arms,

interconnecting said units in side to side abutting relation to form a dome structure,

said last mentioned step comprising distorting at least some of said units after other units have been assembled and interconnected with each other so as to improve the interfitting relations of unconnected units to the already connected units, and

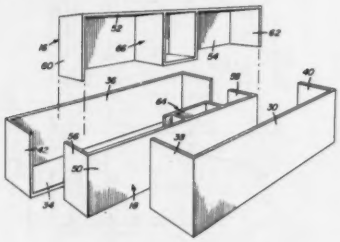
connecting said distorted units to units that have been connected.

4,075,814

MODULAR HOUSING SYSTEM WITH PART OF THE MODULE SERVING AS A SHIPPING CONTAINER FOR THE REMAINDER OF THE MODULE

John Theurer, Alpine, N.J.; Orville F. Beck, Downingtown, Pa., and James T. Doherty, Pelham, N.Y., assignors to Nesters Housing Company, Inc., Newark, N.J.

Filed May 24, 1976, Ser. No. 689,341
Int. Cl.[2] E04B *1/348*
U.S. Cl. 52—79.5 6 Claims



1. A housing system designed to be transported as a single package, comprising, in combination:

a. a first section including a floor and at least one wall;

b. a second section also including a floor and at least one wall, the second section cooperating with the first section during transport to form a container substantially in the form of a parallelepiped, the first section and second section being of substantially equal size, with each of the first section and second section having the floor and wall thereof disposed perpendicularly along respective peripheral side edges thereof and further including a pair of end walls disposed along end portions of the floor and wall at perpendicular angles thereto, one of the end walls of each of the first section and second section being disposed adjacent to and overlying an end wall of the other section, with the walls of the first section and second section being side walls, the first section and second section interfitting with respect to one another to form a rectangular parallelepiped and the end walls being disposed in the planes of the ends of the parallelepiped;

c. a third section including a floor and at least one wall; and

d. a fourth section including a floor and at least one wall, the fourth section cooperating with the third section during transport to form a package substantially in the form of a parallelepiped, the package formed by the third section and the fourth section being smaller in size than the container formed by the first section and the second section and disposed within the container, each of the first section and second section being provided with openings variously forming doors and windows of a building constructed partially from each section, the third section and fourth section being provided with partitions offset from one another when the third section and fourth section are arranged cooperating with one another during transport to form a package substantially in the form of a parallelepiped.

4,075,815

AUTOMATIC PACKAGE WRAPPING MACHINE

Herbert K. Carver, Jr., Cornwells Heights; Albert H. Chant, Holland; James F. Hall, Ardsley; Omar Hansen, Jr., Yardley, and John G. Lord, Swarthmore, all of Pa., assignors to Franklin Electric Subsidiaries, Inc., Fallsington, Pa.

Filed Apr. 30, 1976, Ser. No. 681,828
Int. Cl.[2] B65B *11/26*
U.S. Cl. 53—32 32 Claims

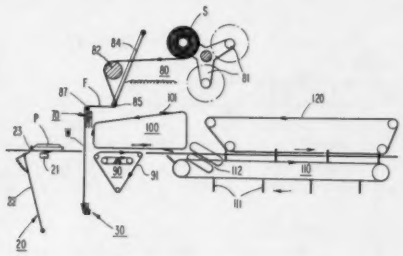
32. A method of wrapping a package in heat-sealable thingage film comprising the steps of:

a. providing a straight in-line horizontal support path for said package;

b. providing a substantially vertical curtain of continuous seamless film across said path, said film having a severed end off the path and a continuous seamless length extending back across the path to the supply source;

c. moving said package toward and into said curtain of film;

d. gripping the severed end of film and moving said end toward said package path at all times during the period that said package is being moved toward and into said curtain, thereby to form one portion of a tubular loop of film about the package, the forming of said loop being characterized by substantially no relative movement between the film and the package at the forward edge of the package;



e. pressing against the continuous length of film along a line located substantially at said original curtain line to assist in forming the other portion of said tubular loop of film;

f. servering the film behind the rearward edge of the package after the package has advanced beyond the original curtain line;

g. pressing the one and other portions of film together behind the package to close the loop;

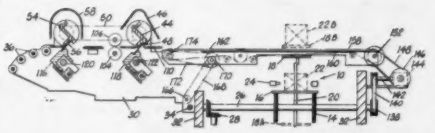
h. sealing the pressed-together portions behind the package while continuing to advance the package along said in-line horizontal path.

4,075,816

WRAPPER SHEET FEED FOR WRAPPING MACHINE

Ronald Holt, Battle Creek, and Daniel J. Smith, Kalamazoo, both of Mich., assignors to Franklin Electric Subsidiaries, Inc., Bluffton, Ind.

Filed Jan. 6, 1977, Ser. No. 757,365
Int. Cl.[2] B65B *57/12;* B65H *7/02*
U.S. Cl. 53—74 8 Claims



1. In a wrapping machine having a vertically reciprocating elevator for lifting articles to be wrapped from a supply conveyor having article advancing flights, wrapper sheet locating belts for locating a sheet of wrapper film over the path of articles elevated by said elevator, feed rolls for delivering wrapper film stock to said locating belts, a rotating cutter bar located over the film stock between said feed rolls and said locating belts, means for coordinating the action of said elevator, said supply conveyor, said feed rolls, said locating belts, and said cutter bar comprising:

first drive connections connected to continuously rotate said cutter bar through one revolution and reciprocate said

elevator in timed relation to the advance of each flight of said conveyor,

a normally engaged single position mechanical clutch rotatable through one cycle with each rotation of said cutter bar and having a disengaging pawl adapted to disengage the clutch at the start of any rotational cycle thereof,

an article sensing switch connected to close a first solenoid switch responsive to presence of an article to be wrapped,

a first timing cam driven continuously with said conveyor and arranged to close an energizing switch in series with said sensing switch prior to and during the start of each cycle of said clutch, said switches being connected to energize a solenoid adapted to retract the disengaging pawl of said clutch whereby the clutch remains engaged for a following full cycle,

a holding solenoid and circuit energized by said cam operated switch,

a second normally closed and continuously driven cam operated switch connected in series in said holding circuit and arranged to momentarily open the holding circuit to the solenoid of said clutch pawl during the latter part of the closed cycle of said first cam driven switch,

said feed rolls being connected to be driven through said clutch,

a striker bar rockably supported under the incoming film of wrapper stock and movable into coacting relation with said cutter bar,

a solenoid operated valve connected to a cylinder to swing said striker bar into coacting cutting relation to said cutter bar, the solenoid of said valve being connected to said energizing switch for actuation of said striker bar with said solenoid for retracting said clutch pawl,

a sequence switch driven with said conveyor and making one revolution during each revolution of the mechanical clutch and arranged to successively and momentarily open one switch and close two switches during each cycle,

a shaft having a sprocket rotatable thereon, the sprocket being driven continuously with said cutter bar,

an electric clutch adapted to connect said sprocket to said shaft, said wrapper locating belts being driven from said shaft,

an electric brake arranged when energized to stop said shaft and said locating belts,

pressure rollers swingably positioned over said locating belts and biased against said locating belts and wrapper sheets thereon,

solenoids connected to raise said pressure rollers from said belts,

sensing means positioned to sense the arrival of the leading edge of a wrapper sheet in said belts at the desired position over said elevator,

a normally open switch connected in the energizing circuit to said brake and arranged to be closed by actuation of said sensing means,

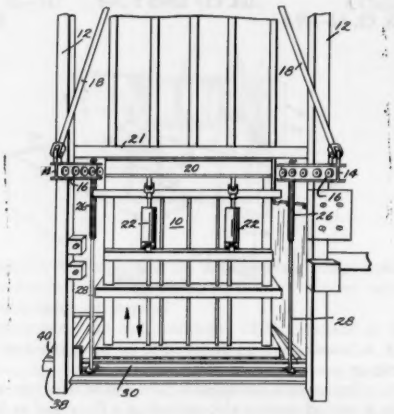
and circuit control means connected to be activated by said sequence switch to successively (a) de-activate the energizing circuit to said brake, and open a holding circuit to deenergize the solenoids holding said pressure rollers raised and to simultaneously close the energizing circuit to said electric clutch to start said wrapper locating belts at the end of one cycle and the start of a succeeding cycle, then (b) close a first normally open switch to a solenoid to open the energizing circuit to said electric clutch whereby said locating belts start to decelerate, and close one switch in the energizing circuit to said brake, and then (c) close a second normally open switch to the solenoid to energize the solenoids to raise said pressure rollers from said wrapper sheet locating belts, and reenergize said electric clutch to drive said locating belts.

4,075,817

APPARATUS FOR BALING COMPRESSIBLE MATERIAL

Edward T. Gieske, Jr., Chattolanee Hill, Owings Mills, Md. 21117

Filed Apr. 14, 1976, Ser. No. 676,675
Int. Cl.[2] B65B *13/20, 63/02*
U.S. Cl. 53—124 A **9 Claims**



1. Apparatus for baling a compressible material between bottom and top bale boards comprising:

means for supporting said bottom board, said supporting means including a frame and a plurality of spaced parallel rollers mounted in said frame;

a chamber movable between a retracted position and a position at which said supporting means is engaged and said bottom board is enclosed;

a door in said chamber to permit insertion of the bale boards within the chamber;

a ram movable within said chamber, said ram having a material and top board-contacting surface comprising a plurality of spaced parallel ribs extending in a direction perpendicular to the axes of rotation of said rollers;

means for introducing material to be compressed to said chamber when said chamber engages the support means, a bottom board is supported by the support means, and said ram is in a withdrawn position within the chamber;

means for moving said ram from the withdrawn position to compress material introduced into the chamber onto the bottom board;

means for controlling movement of said ram within the chamber for first compressing material, then retracting said ram to a position adjacent the door to allow the top board to be inserted within the chamber between the ram and the compressed material, and then moving the ram in a single direction to engage and displace said top board to a bale forming position at which the material and the boards are formed into a bale having a predetermined dimension;

means for moving said chamber to its retracted position when the bale is formed to said dimension;

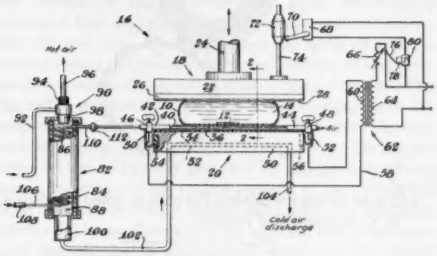
ejector means operable when said chamber moves to the retracted position and while said ram is retained in its bale forming position for displacing the bale from said supporting means, in a direction perpendicular to said roller axes, to a location between sets of additional rollers spaced to the dimension of said bale; and

means responsive to the position of the ejector means follownig displacement of the bale for returning the ram to the withdrawn position and the chamber to the supporting means-engaging position.

4,075,818
IMPULSE SEALING APPARATUS

Donald R. Wright, Midland, Mich., and Henry D. Swartz, Chestnut Hill, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 4, 1976, Ser. No. 693,070
Int. Cl.[2] B65B *51/30, 51/14, 9/12*
U.S. Cl. 53—180 R **1 Claim**



1. Apparatus for heat sealing of thermoplastic web materials in form-fill and seal fluid pouch packaging machines comprising, in combination: opposed sealing jaws faced with a release material, at least one sealing jaw containing a first internal cooling channel and a second internal cooling channel, one of said cooling channels being located closely adjacent the face of said jaw, a single vortex tube in open communication with a heat exchanger and one of said cooling channels, said heat exchanger having a cooling coil and an exhaust means, one of said cooling channels being supplied cooled gas from the coil of said heat exchanger, the other of said channels being supplied cooled gas from said vortex tube through the exhaust means of said heat exchanger, whereupon after the thermoplastic web is sealed the same is cooled rapidly by the plural fluid flows contained in jaw.

4,075,819
FINGER ASSEMBLY FOR PACKER GRID

John L. Raudat, North Madison, and Lloyd D. Johnson, Portland, both of Conn., assignors to Emhart Industries, Inc., Farmington, Conn.

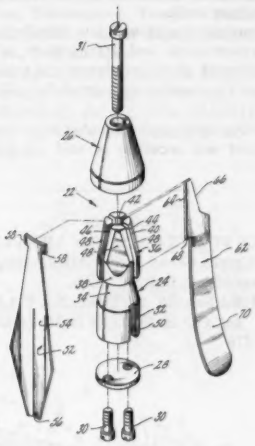
Filed Mar. 8, 1977, Ser. No. 775,669
Int. Cl.[2] B65B *39/02*
U.S. Cl. 53—248 **10 Claims**

1. A finger assembly for use in a packer grid, said finger assembly comprising:

a. a body having an upper frustoconical section having at least one flat thereon;

b. at least one flexible finger extending downwardly and outwardly from said body, said finger having an upper portion positioned against said flat, said upper portion having at least one ear extending therefrom; and

c. cap means attached to said body for holding the upper portion of said finger against said flat, said cap having a

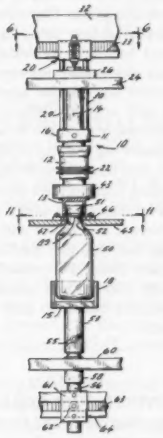


circumferential groove in its interior surface, the ear of said finger extending into said groove.

4,075,820
SPIN WELDING APPARATUS

Wendell Evert Standley, Lake Forest, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Jul. 28, 1976, Ser. No. 709,362
Int. Cl.[2] B65B *7/28;* **B67B** *3/08;* **B29C** *27/08;* **B23K** *28/00*
U.S. Cl. 53—329 **34 Claims**



17. An apparatus for frictionally joining a cap member to the neck of a container comprising:

a rotatable spindle member having a head portion adapted to releasably engage said cap member;

means to support said container and prevent said container from rotating;

means to rotatably support said spindle member;

means to move said spindle member toward and away from said container;

biasing means operatively associated with said means to move said spindle member toward and away from said container to effect a predetermined tension on said spindle

member prior to and during contact of said cap member on said container neck and limiting the stroke of travel of said spindle member as said cap member is moved toward said container neck;

a pair of oppositely disposed jaw members each having a surface constructed and arranged to substantially surround said neck of said container and said container neck includes a rib member supported by said jaw members; and

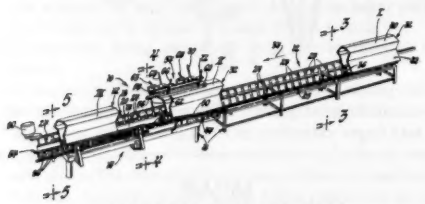
means to rotate said spindle member so as to effect frictional engagement and securing of said cap member on said neck.

4,075,821

APPARATUS FOR CLOSING AN ARTICLE WRAPPER

Raymond J. Cavell, Grand Blanc, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 24, 1977, Ser. No. 771,434
Int. Cl.[2] B65B *7/20*; B65C *11/04*
U.S. Cl. 53—376 **3 Claims**



1. An apparatus for closing an article wrapper having a lower tubular portion integrally formed with an upper flap that terminates with a straight edge, said apparatus including an elongated frame divided into an entrance section and a conveyor section, said entrance section having means for supporting said article wrapper for movement towards said conveyor section while maintaining said flap spaced from said tubular portion, said conveyor section being axially aligned with said entrance section and having a power driven belt for moving said article wrapper along said conveyor section, means carried by said conveyor section for applying adhesive to said tubular portion as said article wrapper moves into said conveyor section, a positioner member located adjacent said conveyor section for receiving the flap of said article wrapper and for guiding the flap into contact with said tubular portion after the adhesive is applied thereto, said positioner member having a flat floor, means for engaging said flap and for maintaining the straight edge thereof in contact with said flat floor prior to the flap contacting said tubular portion, and said conveyor section having means formed therewith for maintaining said flap in contact with said tubular portion to assure that said adhesive is substantially cured so that said flap is bonded to said tubular portion.

4,075,822

CROP CONDITIONER ROLL STRUCTURE

Warner M. Heckley, Rockford, and Gerald F. Richards, Celina, both of Ohio, assignors to Avco Corporation, Coldwater, Ohio

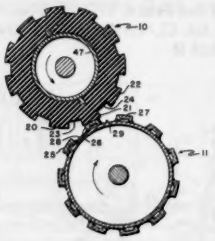
Continuation of Ser. No. 514,213, Oct. 11, 1974, abandoned.
This application Dec. 3, 1975, Ser. No. 637,190
Int. Cl.[2] A01D *49/00*
U.S. Cl. 56—1 **3 Claims**

1. In a hay conditioner, the improvement which provides, in combination:

an upper conditioner roll having an axis and circumferentially spaced radially extending rib formations running at an angle relative to its axis,

a lower conditioner roll having an axis and circumferentially spaced radially extending ribs running at an angle to the axis of said second roll,

the formations on the first roll and ribs on the second roll being complementary and in face-to-face symmetrical peripheral registry, the upper roll being of resilient material and the lower roll being of rigid material, the rolls being adjacently disposed,



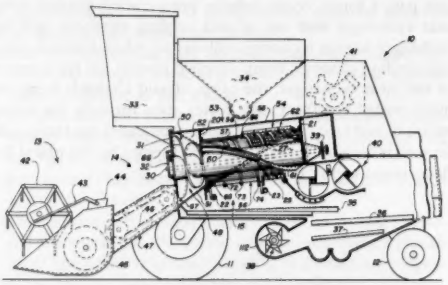
and gear means for driving the rolls in timed synchronism so as to maintain said registry.

4,075,823

COMBINE HARVESTER

Edward W. Rowland-Hill, Lancaster, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Jul. 14, 1976, Ser. No. 705,379
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—14.6 **12 Claims**



1. A combine harvester comprising

(a) a mobile frame adapted to be propelled over a field of grain bearing crop material,

(b) a header carried by the frame and extending forwardly therefrom, said header having means for removing the crop material from the field and delivering it in a generally rearward direction,

(c) infeed means mounted on the frame for receiving crop material from said header and conveying it in a generally rearward direction,

(d) two generally cylindrical units for receiving material from said infeed means, said units mounted in spaced relation on said frame and extending in a generally fore-and-aft direction, each unit comprising a threshing section having a transversely curved concave and a separating section rearward of said concave,

(e) means mounted on said frame for enclosing said cylindrical units, said enclosing means including side and top wall members extending substantially the full length of said separating sections, said side wall members being spaced from and outboard of said separating sections,

(f) grain receiving means extending between said side members and underneath at least a portion of said cylindrical units, and

(g) two fore-and-aft extending rotors, one rotatably mounted in each of said cylindrical units, means for rotating said rotors in opposite directions wherein the peripheries thereof pass downwardly with respect to each other at

adjacent sides, said rotors each including threshing means adjacent said concave and crop engaging means for imparting centrifugal force to crop material in said separating section for effecting separation of grain from the crop material under conditions where said rotors are rotated,

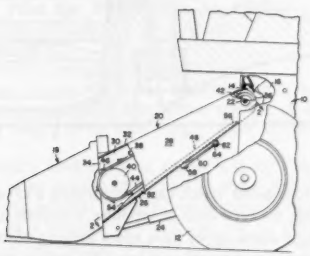
(h) said separating sections each include a configuration of apertures permitting discharged grain to pass therethrough over substantially the full 360° circumference of said cylindrical units whereby the grain centrifugally separated from said crop material is discharged outwardly therethrough toward said side and top walls of said enclosing means and downward in the direction of said grain receiving means the direction thereof being determined by the radial position at which grain is dislodged from the crop material as it is being conveyed rearwardly through said separating section, all of said grain so discharged being free to eventually gravitate to said grain receiving means by virtue of the spaced relation of the cylindrical units and said enclosing means, the portion of said grain discharged in the direction of the adjacent unit is intermingled and distributed substantially evenly in the central portion of the grain receiving means.

4,075,824

HARVESTING MACHINE FEED MECHANISM

Edward John Hengen, Bettendorf, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 26, 1976, Ser. No. 735,380
Int. Cl.[2] A01D *45/00*
U.S. Cl. 56—14.6 **12 Claims**



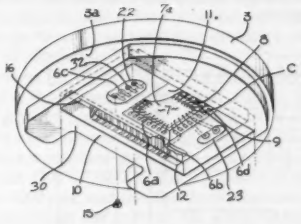
1. In a harvesting machine having a mobile body with a crop inlet opening and a crop treating mechanism disposed in the body and a forward harvesting header adapted to remove crop material from the field as the machine advances, the combination therewith of an improved mechanism for feeding crop material from the header to the crop inlet opening comprising: a housing having a floor, opposite generally fore and aft sides extending upwardly from the floor, a forward inlet in crop receiving relationship with the header and a rearward outlet in crop transfer relationship with the body inlet opening; a conveyor means mounted in the housing above the floor and operative to move crop material rearwardly, along the floor from the housing inlet to the outlet; a crop directing means mounted in the housing between the conveyor means and the floor and including a plurality of generally upright vanes, the crop directing means being shiftable between alternate positions wherein the vanes are inclined toward one side of the housing or the other to respectively direct crop material being moved rearwardly through the housing by the conveyor means toward one side of the body crop inlet opening or the other; and control means for selectively controlling the position of the crop directing means.

4,075,825

ELECTRONIC TIMEPIECE SUBSTRATUM

Tomomi Murakami, Yamato; Masaru Yoshida, Murayama; Satoshi Kimura, Tokorozawa; Tetuya Yasuda, Tokyo, and Yoshio Iinuma, Kodaira, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jun. 30, 1975, Ser. No. 592,099
Claims priority, application Japan, Jun. 28, 1974, 49-073420; Aug. 27, 1974, 49-098153; Jul. 22, 1974, 49-087116[U]
Int. Cl.[2] G04C *3/00;* **G04B** *37/00*
U.S. Cl. 58—23 R **21 Claims**



1. A watch body for an electronic watch comprising:

a. an upper case and a bottom watch cover, said upper case and bottom cover each containing means for selectively interlocking one with the other thereby forming a discrete watch body;

b. a lead package frame sandwiched between said upper case and said bottom cover, said lead frame having first and second sides, said first side having a first cavity disposed therein arranged and configured to receive an integrated circuit chip, and said second side of said lead frame arranged and configured to detachably engage a printed circuit board; and

c. a liquid crystal cell disposed in an associated holder member such that said liquid crystal cell is adjacent said first cavity on said lead frame, said holder member extending downward from said lead frame.

4,075,826

TIMING CIRCUIT FOR DIGITAL WRISTWATCH

Norman E. Moyer, Newport Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 19, 1975, Ser. No. 578,689
Int. Cl.[2] G04C *3/00;* **G04B** *19/00*
U.S. Cl. 58—23 R **3 Claims**

1. A digital timing circuit in a digital watch with two electro-optical display elements, when said circuit is activated by a manually operable switch, the two display elements first display the hours information, for as long as the switch is closed and after the switch is opened, the display elements show the minutes information and then turn off, comprising:

a clock pulse source;

first gate means having first and second input connections and an output connection;

second gate means having first and second input connections and an output connection;

said second input of said second gate connected to said output of said first gate;

third gate means having first and second input connections and an output connection;

said output of said second gate connected to said second input of said third gate;

said first input of said second gate connected to said output of said third gate;

a manually operable switch for activiating said digital timing circuitry, said switch connected to said first input to said third gate;

first flip-flop having first and second input connections and first and second output connections;

second flip-flop having first and second input connections and first and second output connections;

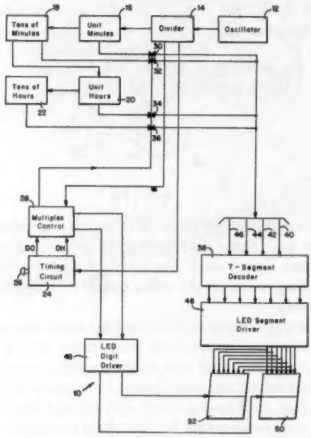
said clock pulse source connected to said first input to said first flip-flop;

said first output of said first flip-flop connected to said second input to said first gate;

said first output of said second flip-flop connected to said first input of said first gate;

said first input to said third gate connected to the resets of said first and second flip-flop;

first and second electro-optical display elements which display the digits of first and second sets of horological information;



said first input to said third gate being connected to said first electro-optical display element;

said output of said second gate being connected to said second electro-optical display element;

said second set of horological information is displayed on said electro-optical display when said output of said second gate is at a logical binary high level and said input to said third gate is at a logical binary low level; and

said first set of horological information is displayed on said electro-optical display when said output of said second gate and said input to said third gate are at a logical binary high level.

4,075,827

ADJUSTABLE CIRCUIT FOR AN ELECTRONIC TIMEPIECE

Makoto Yoshida; Yoshifumi Mochizuki, both of Tokorozawa; Masamichi Yamauchi, Ichikawa, and Hideyuki Kawashima, Higashi Kurume, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

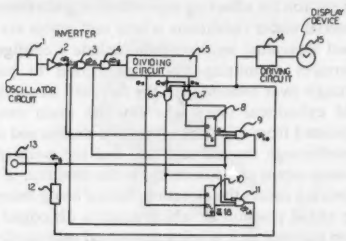
Filed Jul. 23, 1976, Ser. No. 708,221

Claims priority, application Japan, Aug. 1, 1975, 50-94010

Int. Cl.[2] **G04C** *3/00;* **H03K** *5/159;* **H03B** *3/04*

U.S. Cl. 58—23 AC **13 Claims**

1. A circuit for an electronic timepiece of the type having a piezo-electric reference oscillator, an oscillator circuit coupled to said reference oscillator for producing an electrical oscillation of a predetermined frequency, a divider circuit that divides the frequency of said oscillation, and a driving circuit which drives a display unit using the output of said divider circuit, characterized by the inclusion in said divider circuit of an adder circuit comprising an adder gate and a subtraction



circuit comprising a subtraction gate arranged in series with said adder circuit.

4,075,828

FOUR-SIDED WATER-RESISTANT WATCH-CASE

Hans Ulrich Klingenberg, St. Niklaus near Merzligen, Switzerland, assignor to Century Time Limited, Switzerland

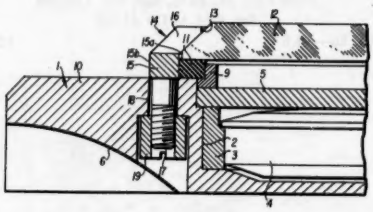
Continuation of Ser. No. 519,293, Oct. 30, 1974, Pat. No. 4,002,020. This application Aug. 23, 1976, Ser. No. 716,710

Claims priority, application Switzerland, Nov. 9, 1973, 15758/73

The portion of the term of this patent subsequent to Jan. 11, 1994, has been disclaimed.

Int. Cl.[2] **G04B** *37/08*

U.S. Cl. 58—90 R **3 Claims**



1. In a four-sided watch-case comprising a crystal made of an inorganic material such as sapphire, a bottom and a middle part having a plane upper face, and a lodging of its lower face for receiving a movement, a frame (**30**) resting on said upper face, a pair of opposed claw members projecting upwardly and inwardly from said frame, a pair of feet projecting downwardly from said frame at the location of said claw members, and a gasket arrangement resting on said upper face inwardly of said frame, said gasket supporting said crystal, said crystal having beveled side edges, said claw members contacting portions of said beveled side edges and leaving other portions of said beveled side edges uncovered and said feet engaging openings through said middle part and said bottom for securing said frame, said crystal and said bottom on both sides of said middle part, thus providing a rigid hollow body wherein the crystal and the bottom act as stiffening parts.

4,075,829

SELF-CONTAINED MINIATURE TIMER

Mark D. Goff, Dallas, Tex., assignor to GRS Instruments, Inc., Dallas, Tex.

Filed Jun. 11, 1976, Ser. No. 695,191

Int. Cl.[2] **G04B** *47/00;* **G04F** *7/04;* **A47F** *7/00*

U.S. Cl. 58—152 T **16 Claims**

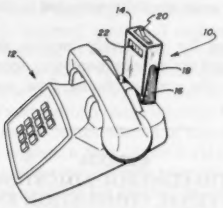
1. A telephone set timer comprising:

a housing having a display aperture in the front surface thereof,

display means mounted within said display aperture for displaying multiple digits,

a bracket having a base surface connected to upwardly extending arms,

pivot means on said arms for connecting said housing between said arms for enabling the attitude of said housing to be adjusted pivotally to any one of a number of fixed positions relative to the telephone set to facilitate viewing of said display by a telephone user,



means for attaching said base surface to a surface of a telephone set such that said display means may be observed by the telephone user,

timing circuitry within said housing for generating periodic timing signals and for driving said display means to display time intervals to the telephone user, and

switch means positioned on said housing for actuation by the telephone user to start and stop operation of said circuitry in order to provide an indication of the time of telephone calls by the user.

4,075,830

SOLID ADHESIVE COMPOSITIONS

Shigeru Nagasawa, Ageo, and Toshinao Okitsu, Tokyo, both of Japan, assignors to Konishi Co., Ltd., Osaka, Japan

Filed Apr. 26, 1976, Ser. No. 680,393

Int. Cl.[2] C08L *91/00*

U.S. Cl. 260—18 N **21 Claims**

1. An adhesive composition comprising:

(a) a water soluble or water dispersible polymer having adhesive properties present in an amount of about 5 to 50% by weight of the total weight of the adhesive composition;

(b) an N-fatty acid acylated amino acid or a salt thereof present in an amount of about 2 to about 30% by weight of the total amount of the adhesive composition; and

(c) water or a mixture of water and one or more organic solvent(s) and/or one or more plasticizer(s), wherein the proportion of said water or said mixture of water and one or more organic solvent(s) and/or one or more plasticizer(s) contained in the adhesive composition is about 30 to 80% by weight of the total adhesive composition, but the proportion of the one or more organic solvent(s) and/or one or more plasticizer(s) is less than the amount of water together therewith.

4,075,831

PROCESS FOR PRODUCTION OF PURIFIED AND HUMIDIFIED FUEL GAS

Rodney McGann, Santa Cruz, Calif., assignor to Texaco Inc., New York, N.Y.

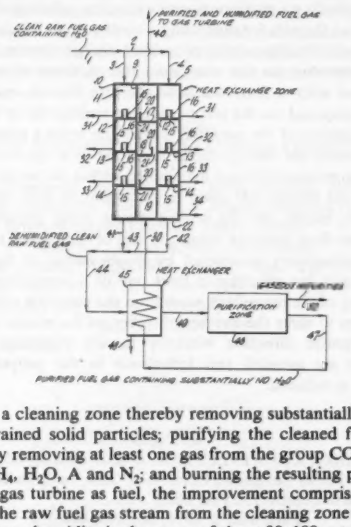
Filed Oct. 27, 1976, Ser. No. 735,926

Int. Cl.[2] F02G *3/00;* **C10K** *1/00*

U.S. Cl. 60—39.05 **14 Claims**

1. A continuous process for producing a stream of purified and humidified fuel gas comprising: (1) passing a clean raw feed gas stream comprising H_2, CO, H_2O, and at least one gas from the group CO_2, H_2S, COS, CH_4, A and N_2 through a heat exchange zone in indirect countercurrent heat exchange with a stream of purified fuel gas which enters said heat exchange zone containing substantially no H_2O and which is produced subsequently in a purification zone at a lower temperature thereby cooling said raw feed gas stream below its dew point, separating out condensed water from said raw feed gas stream in a plurality of vertically spaced horizontal collecting means, and producing a cooled substantially dry raw gas stream; (2) simultaneously in a plurality of vertically spaced horizontal revaporizing means introducing at least a portion of said condensed water into said stream of purified fuel gas passing through said heat exchange zone in (1) to produce a separate product gas stream of purified and humidified fuel gas; (3) purifying the cooled substantially dry raw gas stream from (1) in a purification zone by separating therefrom at least one gas from the group H_2O, CO_2, H_2S, and COS and thereby producing a stream of purified fuel gas containing substantially no H_2O; and (4) introducing at least a portion of said stream of purified fuel gas from (3) into said heat exchange zone in (1) as said stream of purified fuel gas.

5. In a process for the production of fuel gas by the partial oxidation of a hydrocarbonaceous fuel with a free-oxygen containing gas optionally in the presence of a temperature moderator in a free-flow noncatalytic partial oxidation generator to produce a raw fuel gas stream at a temperature in the range of about 1300 to 3500° F and a pressure in the range of about 250 to 1200 psia, said raw fuel gas stream comprising H_2, CO, H_2O, and at least one gas from the group CO_2, H_2S, COS, CH_4, A and N_2, along with entrained solid particles; cooling and cleaning said raw fuel gas stream by direct contact with


PURIFIED AND HUMIDIFIED FUEL GAS TO GAS TURBINE
CLEAN RAW FUEL GAS CONTAINING H2O
HEAT EXCHANGE ZONE
DEHUMIDIFIED CLEAN RAW FUEL GAS
HEAT EXCHANGER
PURIFICATION ZONE
PURIFIED FUEL GAS CONTAINING SUBSTANTIALLY NO H2O

water in a cleaning zone thereby removing substantially all of said entrained solid particles; purifying the cleaned fuel gas stream by removing at least one gas from the group CO_2, H_2S, COS, CH_4, H_2O, A and N_2; and burning the resulting product gas in a gas turbine as fuel, the improvement comprising: (1) passing the raw fuel gas stream from the cleaning zone having a percentage humidity in the range of about 30–100, a temperature in the range of about 200 to 400° F, and a pressure substantially that of the gas generator less ordinary pressure drop in the line through a heat exchange zone in indirect countercurrent heat exchange with a stream of substantially dry purified fuel gas produced subsequently in a purification zone at a temperature in the range of about 60 to 180° F, thereby cooling said raw fuel gas stream to a temperature in the range of about 80 to 200° F and below its dew point and condensing and separating out water therefrom in a plurality of vertically spaced horizontal collecting means to produce a cooled substantially dry raw fuel gas stream; (2) in a plurality of vertically space horizontal revaporizing means introducing at least a portion of said condensed water into said stream of purified fuel gas passing through said heat exchange zone in (1) to produce a separate product gas stream of purified and humidified fuel gas; (3) purifying the cooled cleaned substantially dry raw fuel gas stream leaving (1) in a purification zone by separating therefrom at least one gas from the group CO_2, H_2S, COS, and H_2O, thereby producing a stream of substantially dry purified fuel gas; (4) introducing at least a portion of said

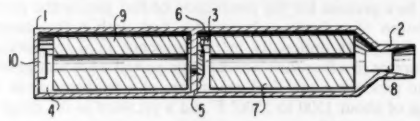
stream of purified fuel gas from (3) into said heat exchange zone in (1) as said stream of substantially dry purified fuel gas; and (5) burning at least a portion of said stream of purified and humidified fuel gas from (2) in a gas turbine.

4,075,832

PARTITION FOR ROCKET MOTORS

Walter Helmut Diesinger, Bergisch Gladbach, and Klaus Peter Kosiolek, Konigswinter, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Dec. 5, 1975, Ser. No. 637,958
Claims priority, application Germany, Dec. 9, 1974, 2458180
Int. Cl.[2] F02K *9/04;* **F16K** *15/03*
U.S. Cl. 60—245 **19 Claims**



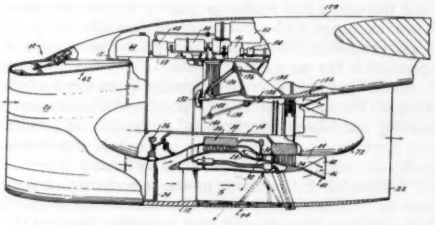
1. A partition arrangement for rocket motors having an axis with at least two mutually independent longitudinally spaced thrust stages and nozzle and nose sides, the partition arrangement including a partition means extending substantially transversely to the axis for separating a combustion chamber on the nozzle side having a solid propellant charge therein from another chamber on the nose side, the partition means being provided with at least one flow aperture therein, and sealing means disposed on the nozzle side for sealing the at least one flow aperture of the partition means, the sealing means being displaceable for freeing the at least one flow aperture of the partition means and being maintained within the another chamber on the nozzle side upon displacement, at least one of the partition means and the sealing means being provided with only one flow aperture along the axis of the rocket motor for being completely uncovered by displacement of the sealing means and for effecting at least one of a concentration and focusing of the propellant gases from the nose side combustion chamber to enter the another chamber on the nozzle side only in a central direction whereby locally excessive thermal stresses are avoided and turbulence in the propellant gas stream is reduced.

4,075,833

VARIABLE AREA INLET FOR A GAS TURBINE ENGINE

Donald Farley Sargisson, Cincinnati, Ohio, assignor to General Electric Company, Lynn, Mass.

Filed Jan. 2, 1976, Ser. No. 646,075
Int. Cl.[2] F02K *3/06, 11/00*
U.S. Cl. 60—262 **4 Claims**



1. A variable area inlet for a gas turbine engine which includes an outer nacelle circumscribing a core engine comprising a hinged wall assembly forming the interior face of the outer nacelle and extending from the upstream end of the inlet to a point upstream of the core engine said hinged wall assembly comprising:

a plurality of circumferentially spaced acoustically absorbent panels pivotally mounted to the upstream end of the outer nacelle and separated by a plurality of circumferentially spaced wedge members,

a plurality of circumferentially spaced acoustically absorbent aft panels separated by the wedge members, pivotally mounted at their upstream ends to the downstream end of axially aligned respective forward panels and having their downstream ends pivotally mounted to the interior of the nacelle, and

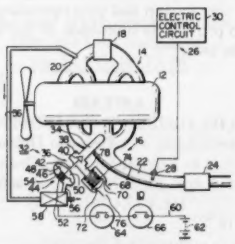
actuating means for selectively moving the panels away from or toward the nacelle thereby to decrease or increase respectively the cross-sectional flow area of the inlet throat.

4,075,834

AIR-FUEL RATIO CONTROL ADJUSTING SYSTEM IN AN INTERNAL COMBUSTION ENGINE

Masaaki Saito, and Hidehiro Minami, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Dec. 3, 1975, Ser. No. 637,311
Claims priority, application Japan, Dec. 6, 1974, 49-140253
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—276 **5 Claims**



1. An air-fuel ratio control adjusting system in combination with an internal combustion engine and a motor vehicle equipped with said engine, said engine including an intake passageway for feeding air into said engine, a throttle valve rotatably mounted in said intake passageway, an air-fuel mixture forming device communicating with said intake passageway for feeding fuel into air fed through said intake passageway to form an air-fuel mixture to be burned in said engine, and an exhaust gas passageway for conducting exhaust gas from said engine, said system comprising a device for electrically controlling the air-fuel ratio of said air-fuel mixture to a desired air-fuel ratio, a sensor located in said exhaust gas passageway for sensing a concentration of oxygen contained in the engine exhaust gas which concentration is a function of the air-fuel ratio of said air-fuel mixture burned in said engine, said sensor having means to generate an output signal having a value representative of the sensed concentration of said oxygen, an electric control circuit which is electrically connected to said sensor and compares the value of said output signal of said sensor with a reference value representative of said desired air-fuel ratio, and has means to generate an error signal representative of a difference between the value of said output signal and said reference value, and fuel flow control means which is integral with said air-fuel mixture forming device and is electrically connected to said control circuit to receive said error signal thereof and controls in accordance with said error signal the flow of fuel fed into said air to thereby control, to said desired air-fuel ratio, the air-fuel ratio of said air-fuel mixture formed by said air-fuel mixture forming device, and a secondary air supply device for feeding secondary air into said exhaust gas passageway during idling and slow speed running of said engine for increasing the concentration of said oxygen in

said engine exhaust gas sensed by said sensor, said secondary air supply device thereby causing said fuel flow control means to temporarily increase the flow of fuel fed into said air to enrich said air-fuel mixture formed by said air-fuel mixture forming device, said secondary air supply device comprising passage means opening into said exhaust gas passageway in a position upstream of said sensor for supplying secondary air into said exhaust gas passageway, a throttle switch opened in response to a first degree of opening of said throttle valve which is above a predetermined value and closed in response to a second degree of opening of said throttle valve which is below said predetermined value and representative of idling and slow speed running of said engine, a vehicle speed switch opened in response to a first speed of said motor vehicle which is above a predetermined value and closed in response to a second speed of said motor vehicle which is below said predetermined value and is representative of idling and slow speed running of said engine, a flow control valve located in said passage means, and operating means connected to said throttle and vehicle speed switches for causing, in response to opening of at least one of said throttle and vehicle speed switches, said flow control valve to close said passage means to inhibit supply of said secondary air into said exhaust gas passageway and further causing, in response to closing of both said throttle and vehicle speed switches, said flow control valve to open said passage means to permit supply of said secondary air into said exhaust means to increase the concentration of said oxygen sensed by said sensor.

4,075,835

ADDITIONAL AIR CONTROL DEVICE

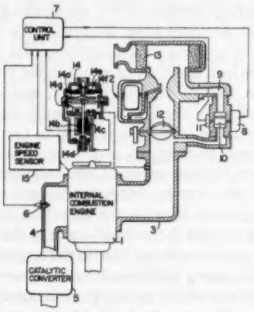
Tadashi Hattori, Okazaki; Takamichi Nakase, Gamagori, and Hiroaki Yamaguchi, Aichi, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Nov. 9, 1976, Ser. No. 740,173

Claims priority, application Japan, Nov. 11, 1975, 50-135394

Int. Cl.[2] F02B *75/10*

U.S. Cl. 60—276 **4 Claims**



2. An additional air control device for an internal combustion engine which has an intake system, an exhaust system, and a catalytic converter for purifying exhaust gases comprising:

a carburetor connected to the intake system of said internal combustion engine and including a passage for supplying substantially rich air-fuel mixture, said passage being provided with a throttle valve for controlling an amount of air-flow;

means defining a bypass passage for supplying additional air to the downstream side of said throttle valve;

a control valve mounted in said bypass passage for controlling the amount of additional air flowing therethrough;

drive means coupled to said control valve for driving said control valve to open and close;

gas sensing means mounted in the exhaust system of said engine upstream of said catalytic converter for producing a gas sensing signal corresponding to the composition of exhaust gases flowing through said exhaust system;

rotational speed sensing means for sensing the rotational speed of said engine and thereby producing an electrical digital rotational speed signal;

pressure sensing means for sensing the vacuum produced in said intake system of said engine and thereby producing an electrical vacuum signal; and

electronic control means operatively connected to said gas sensing means, said rotational speed sensing means, said pressure sensing means and said drive means;

said electronic control means being responsive to said gas sensing signal, said digital rotational speed signal and said vacuum signal for alternately driving and stopping said drive means repeatedly in a selected direction; and

said electronic control means including a comparison circuit for receiving said gas sensing signal and comparing the same with a preset value to determine whether said gas sensing signal is greater or smaller than said preset value and thereby determine the direction of operation of said drive means, a D-A converter circuit for converting said digital rotational speed signal into an analog signal by D-A conversion, a timing control circuit for receiving said analog signal and said vacuum signal to determine the running time and stopping time of said drive means, and a switching circuit responsive to the signals from said comparison circuit and said timing control circuit for producing a drive means driving signal, whereby the air-fuel ratio of mixture supplied to said engine is maintained at a stoichiometric air-fuel ratio to properly adjust the composition of exhaust gases flowing into said catalytic converter.

4,075,836

EXHAUST MANIFOLD FOR INTERNAL COMBUSTION ENGINE

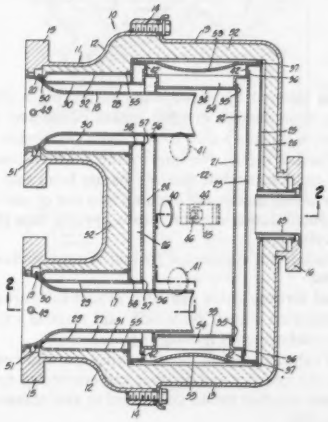
Shuichi Yamazaki, Kamifukuoka; Ikuo Kajitani, Niiza, and Michio Kawamoto, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 16, 1976, Ser. No. 677,668

Claims priority, application Japan, Apr. 22, 1975, 50-54081[U]; May 28, 1975, 50-70993[U]; May 28, 1975, 50-70994[U]; May 28, 1975, 50-70995[U]

Int. Cl.[2] F01N *3/10*

U.S. Cl. 60—282 **8 Claims**



1. An exhaust manifold for use with a multicylinder internal combustion engine having exhaust ports, comprising, in combination: an external housing, a plurality of laterally spaced parallel exhaust inlet pipes positioned to receive exhaust gases from the exhaust ports of the engine, first, second and third concentric shells extending at substantially right angles to said

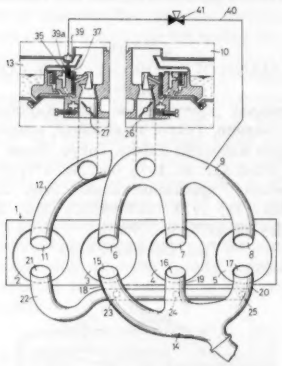
exhaust inlet pipes and defining first, second and third reaction chambers, means closing the ends of said chambers, said second shell encircling the first shell and the third shell encircling the second shell, said exhaust inlet pipes discharging into the first reaction chamber within said first shell, said first shell having an opening communicating with the second reaction chamber between said first shell and said second shell, said second shell having openings communicating with the third reaction chamber between the second shell and the third shell, a first tube concentric with and encircling each exhaust inlet pipe, respectively, and communicating with said second reaction chamber, a second tube encircling each said first tube, respectively, and communicating with the third reaction chamber between said second and third shells, port means in each first tube establishing communication between the interior thereof and the interior of the encircling second tube, and a discharge pipe communicating with said third reaction chamber.

4,075,837

EXHAUST GAS PURIFYING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Masanori Hanaoka, Toyoda, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation-in-part of Ser. No. 622,975, Oct. 16, 1975, abandoned. This application Sep. 14, 1976, Ser. No. 723,289
Claims priority, application Japan, Jun. 18, 1975, 50-74178
Int. Cl.[2] F02B *75/10*
U.S. Cl. 60—282 **4 Claims**



1. In an internal combustion engine having a plurality of cylinders, main suction conduit means connected to a main carburetor, a throttle valve in said main carburetor and main exhaust conduit means, the improvement which comprises:

second suction conduit means separate from said main suction conduit means and opening into one of said cylinders, said main suction conduit means opening into the remaining cylinders;

a sub-carburetor connected to said second suction conduit means;

a second throttle valve provided in said sub-carburetor and mounted on a shaft on which said throttle valve in said main carburetor is mounted;

second exhaust conduit means having one end connected to said one cylinder and another end connected to said main exhaust conduit means connected to said remaining cylinders; and

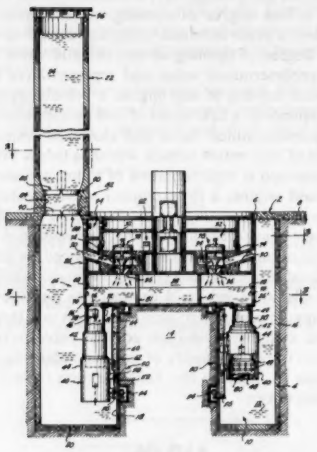
means connected between said sub-carburetor and said main suction conduit means and responsive to a negative pressure prevailing in said main suction conduit means for controlling supply of fuel through said second suction conduit means, whereby fluid flow through said one cylinder into said main exhaust conduit means is restricted to atmospheric air.

4,075,838

CLOSED SYSTEM, STANDPIPE OPERATED HYDROELECTRIC POWER PLANT

Charles Pelin, R.R. 1, Box 1460, Eastsound, Wash. 98245

Filed Jul. 22, 1977, Ser. No. 817,913
Int. Cl.[2] F16D *33/00*
U.S. Cl. 60—325 **14 Claims**



1. In combination, casing means defining a pressure chamber filled with a body of water and a standpipe relatively upstanding thereabove having a column of water therein communicating with the water in the chamber, a housing enclosed in the pressure chamber and defining a subchamber therein and a series of penstocks which open into the body of water in the pressure chamber at points about the perimeter of the housing below the column of water in the standpipe, and which discharge into the subchamber, hydroelectric power generating means including turbines in the penstocks and means for discharging the tailwater from the respective turbines including nipples on the housing which communicate with the subchamber and open into the body of water in the pressure chamber at levels below that of the subchamber, and which have open-ended thimble-like vessels telescopically engaged thereon, to be extended and retracted in relation to the respective nipples axially thereof, said nipples and vessels having float-operated check valves therein adjacent the subchamber and the end openings of the vessels, respectively, each of which valves is adapted to permit flow in the direction relatively from the subchamber toward the body of water in the pressure chamber when open, and to prevent flow in the opposite direction when closed, there being additional valve means in the tailwater discharge means which are adapted to equalize the pressure in the vessels with that in the body of water in the pressure chamber when the respective check valves in the vessels are closed, drive means for extending and retracting the respective vessels, and control means which are connected to the drive means and operative through the same (1) to extend and retract the respective vessels in staggered sequence about the circumference of the housing, with each vessel undergoing an at-rest period between the respective retraction and extension stages thereof when the vessel is fully retracted, and (2) to control the rate of extension and retraction of the respective vessels and the length of their respective rest periods, as a function of the water level in the subchamber, the height of the column of water in the standpipe being adapted to drive the turbines, the vessels each being adapted in buoyancy to hover in equilibrium in the body of water in the pressure chamber when at rest, and the number of nipples and vessels being adapted in relation to the number of penstocks and turbines so that the vessels collectively discharge the tailwater from the turbines at a rate

adapted to maintain the water level in the subchamber between predetermined limits.

4,075,839

DECOMPRESSION OF PRESSURE CHAMBERS, PARTICULARLY THE DECOMPRESSION OF ACTUATING PRESSURE CHAMBERS OF MINE CAGE HOLDING MEANS

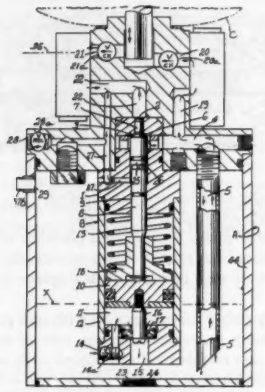
Peter Nesbitt Horne, Sandton, South Africa, assignor to Patent Products Hydraulics (Proprietary) Limited, Edenvale, South Africa

Filed Oct. 4, 1976, Ser. No. 729,365

Claims priority, application South Africa, Oct. 7, 1975, 75/6335

Int. Cl.² F15B *15/22*

U.S. Cl. 60—327 **13 Claims**



1. A method of controlling the decompression of a pressure chamber, including the steps of applying control fluid under pressure to shut off an outlet from the pressure chamber; releasing the control fluid to allow the outlet to open; resisting the release of fluid pressure from the pressure chamber through the outlet; and decreasing the resistance to the release of fluid pressure through the outlet with decreasing pressure in the chamber as control fluid is released, the decrease in the resistance to the release of fluid pressure being controlled by the release of the control fluid, wherein the resistance to the release of fluid pressure is initially decreased at a predetermined rate until a predetermined pressure is reached, whereafter the resistance to the release of fluid pressure is decreased at a higher rate to increase the rate of pressure release, and wherein the outlet is obstructed partially during the initial release of pressure until the predetermined pressure is reached, whereafter the obstruction is removed substantially completely.

4,075,840

BRAKE AND STEERING SYSTEM

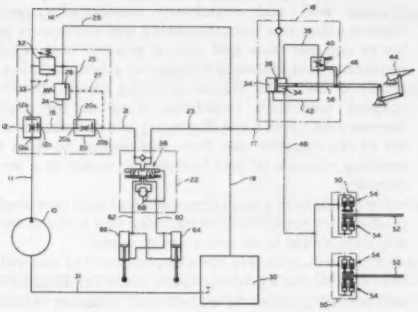
Ronald M. Jesswein, Berrien Springs, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Oct. 6, 1976, Ser. No. 729,927

Int. Cl.² F15B *13/06*

U.S. Cl. 60—422 **7 Claims**

1. A combined brake and steering hydraulic system for a vehicle, comprising a hydraulic pump on the vehicle having an output of a predetermined maximum amount of fluid in a normal operating range, a first priority valve having a first inlet and a first regulated outlet and a first by-pass outlet, the said first inlet connected to receive the entire output of the said pump, the said first regulated outlet during normal operation discharging an approximately constant flow of fluid, an open center hydraulic brake mechanism on the vehicle, first conduit means directing fluid from the said first regulated flow outlet to the said brake mechanism, a second priority valve having a second inlet and a second regulated outlet and a second by-pass outlet, second conduit means directing the flow from the said first by-pass outlet to the said second inlet, an open center hydraulic steering mechanism on the vehicle, the said second



regulted outlet discharging fluid during some conditions of operation at a second approximately constant flow, means directing the flow from the said second regulated outlet to the said steering mechanism, the total of the said first and second constant flows being less than the said predetermined maximum amount, and the said second by-pass outlet discharging the remainder of the fluid output of the said pump.

4,075,841

CONTROL SYSTEM FOR HYDROSTATIC TRANSMISSION

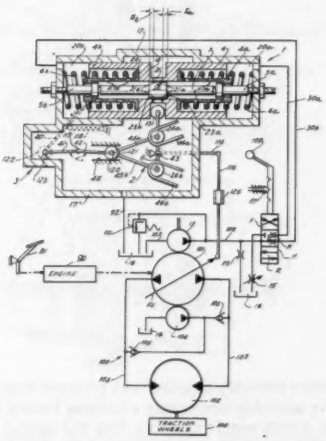
Karlmann Hamma, Tettnang, and Willy Holdenried, Immenstaad, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Jan. 14, 1977, Ser. No. 759,270

Claims priority, application Germany, Jan. 14, 1976, 2601226

Int. Cl.² F16H *39/46*

U.S. Cl. 60—444 **12 Claims**



1. In a hydrostatic transmission including an engine-driven hydrostatic pump, a hydrostatic motor coupled with a load and fluidically linked with said hydrostatic pump, and setting means on said pump for varying the magnitude and sign of a torque fluidically transmitted to said hydrostatic motor, the combination therewith of:

a switchover member mechanically linked with said setting

means, said switchover member having a normal position coinciding with zero torque and being shiftable to either side of said normal position for transmitting a torque of a corresponding sign to said hydrostatic motor;

biasing means urging said switchover member into said normal position;

normally de-energized first actuating means operatively coupled with said switchover member for exerting thereon a directive force displacing said switchover member to one side from said normal position with resulting rotation of said hydrostatic motor in a first direction;

normally de-energized second actuating means operatively coupled with said switchover member for exerting thereon a directive force displacing said switchover member to the opposite side from said normal position with resulting rotation of said hydrostatic motor in a second direction;

selector means with a neutral position and with two working positions for respectively connecting said first and second actuating means to an energy source; and

inhibiting means effective upon displacement of said switchover member by a predetermined minimum distance from said normal position by one of said actuating means for preventing energization of the other of said actuating means whereby a change in sign of said torque upon a subsequent changeover of said selector means from one working position to the other can occur only after a reverse displacement of said switchover member by said biasing means.

4,075,842

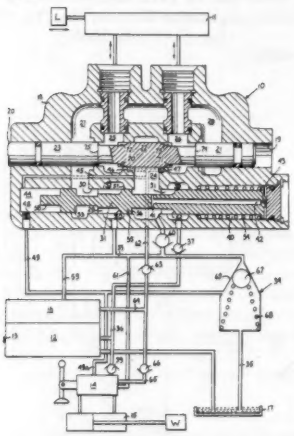
LOAD RESPONSIVE FLUID CONTROL SYSTEM

Tadeusz Budzich, 80 Murwood Dr., Moreland Hills, Ohio 44022

Continuation of Ser. No. 729,696, Oct. 5, 1976, Pat. No. 4,028,889, and a continuation-in-part of Ser. No. 559,818, Mar. 19, 1975, Pat. No. 3,984,979, and Ser. No. 655,561, May 2, 1976. This application Feb. 23, 1977, Ser. No. 771,080

Int. Cl.[2] F16H *39/46*

U.S. Cl. 60—445 **13 Claims**



1. A valve assembly supplied with pressure fluid by a pump, said valve assembly comprising a housing having a fluid inlet chamber, a fluid supply chamber, first and second load chambers, load pressure sensing means operable to transmit a control signal to control means operable to vary flow delivered from said pump to said inlet chamber, and fluid exhaust means, first valve means for selectively interconnecting said fluid load chambers with said load pressure sensing means, said fluid supply chamber and said fluid exhaust means, variable metering orifice means responsive to movement of said first valve means and operable to throttle fluid flow between said fluid supply chamber and said load chambers, second valve means having inlet fluid throttling means and inlet fluid isolating means between said fluid inlet chamber and said fluid supply chamber, said second valve means having means responsive to pressure differential across said variable metering orifice means, and fluid replenishing means operable to supply fluid flow from said fluid exhaust means to one of said load chambers which is not pressurized when said fluid isolating means isolates said fluid supply chamber from said fluid inlet chamber.

4,075,843

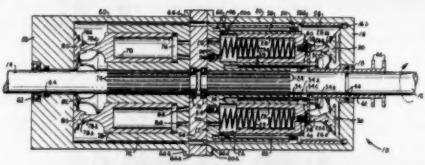
HYDRAULIC TRANSMISSION

Richard E. Leker, 520 N. 73rd St., Lincoln, Nebr. 68502

Filed Oct. 6, 1976, Ser. No. 729,895

Int. Cl.[2] F15B *15/18;* **F16H** *39/46*

U.S. Cl. 60—487 **28 Claims**



1. A hydraulic transmission comprising:

an input shaft adapted to be rotated;

a first hydralic pump presenting a plurality of bores;

pistons disposed for reciprocating movement in the respective bores of said first pump to displace hydraulic fluid therein;

a first cam member for interaction with said pistons to effect reciprocating movement thereof, one of said first pump and first cam member being coupled with said input shaft for rotation therewith;

a second hydraulic pump presenting a plurality of bores and arranged with said first pump in a substantially closed hydraulic circuit, whereby fluid displaced in each pump is directed to the other pump;

pistons disposed for reciprocating movement in the respective bores of said second pump;

valve means in said hydraulic circuit for controlling the fluid flow between said first and second pumps;

a second cam member disposed to interact with the pistons of said second pump;

a rotatable output shaft, one of said second pump and second cam member being coupled with said output shaft to effect rotational driving thereof; and

control means independent of said first and second cam members for controlling the relative fluid displacement of said first and second pumps, thereby controlling the relative rotational speed of said input and output shafts.

4,075,844

HOT-GAS RECIPROCATING ENGINE HAVING CONTROLLED COUPLING OF A COMBUSTION AIR FAN

Johannes W. Schiferli, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 15, 1976, Ser. No. 696,426

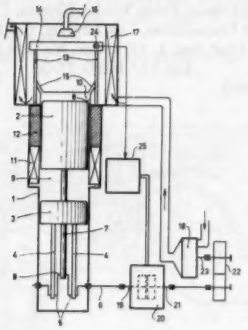
Claims priority, application Netherlands, Jul. 7, 1975, 7508053

Int. Cl.[2] F02G *1/06*

U.S. Cl. 60—524 **3 Claims**

1. A hot-gas reciprocating engine, comprising at least one working space in which a working medium performs a thermodynamic cycle, a burner device, a heater for applying heat from the burner to the working medium, a fan on a fan shaft for applying combustion air to the burner device, and a variable transmission coupling a shaft of the engine to the fan, the transmission including an input shaft coupled to the engine

shaft and an output shaft coupled to the fan shaft, the transmission ratio of said variable transmission being influenced by a control signal which represents an engine parameter, wherein between the output shaft to the variable transmission and the fan shaft a transmission having a fixed transmission ratio is



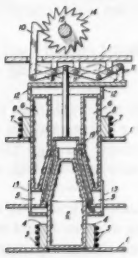
coupled, the variable transmission is constructed as a slip coupling, and the engine comprises means for maintaining the degree of slip of the slip coupling inversely proportional to the heater temperature, said means including a temperature sensor for sensing temperature as the engine parameter.

4,075,845

FREEZE/THAW POWER SYSTEM

Milton Frank Allen, 2989 McCully Drive NE., Atlanta, Ga. 30345

Filed Mar. 25, 1976, Ser. No. 670,455
Int. Cl.² F03G 7/06
U.S. Cl. 60—527 **6 Claims**



1. A method of driving a device using a piston slidably carried in a chamber with the chamber filled with a freezable liquid which experiences a change of volume upon freezing from a liquid state to a solid state comprising the steps of:

(a) associating the piston with the fluid so that the piston is moved in response to a change in volume of the fluid;

(b) freezing the fluid to a substantially solid state to change its volume and move the piston in a first direction by operatively associating a heat pipe with the fluid to withdraw heat from the fluid and freeze the fluid; and,

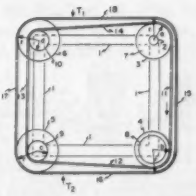
(c) subsequently thawing the frozen fluid from its solid state to its liquid state to change the volume of the fluid and move the piston in a second direction opposite the first direction by operatively associating a second heat pipe with the frozen fluid to add heat thereto and thaw the fluid to its liquid state.

4,075,846

THERMAL ENGINE WITH ENTRAPPED WORKING MEDIUM

Yao Tzu Li, Lincoln, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 4, 1976, Ser. No. 683,167
Int. Cl.² F03G 7/06
U.S. Cl. 60—527 **9 Claims**



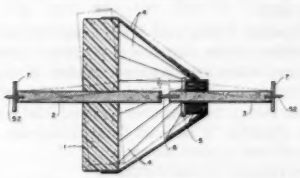
1. A thermal engine comprising a frame, a first set of rollers coupled to said frame, a non-yieldable drive system coupled to each roller of said first set to cause the rollers to rotate with fixed speed ratios, a second set of rollers having rollers in fixed relationship to said first set of rollers, a continuous yieldable belt coupled to each roller of said second set, at least one of said rollers being of a different diameter, at leat one of the rollers being coupled to a shaft to deliver mechanical power as an output, said belt changing its length and tension in response to temperature variation, a heat source, a heat sink of temperature lower than said heat source, a section of said belt being exposed to the heat source to cause a change in tension, a second section of said belt being exposed to the heat sink to cause a different change in the tension, the changes in tension within portions of said belt in combination with the non-yieldable drive coupled to the rollers of the first set producing a mechanical energy output at said output shaft.

4,075,847

DIRECT CONVERSION OF SOLAR ENERGY TO MECHANICAL ENERGY

Edward D. Ray, 2615 NW. 46th Place, Lawton, Okla. 73505

Filed May 7, 1976, Ser. No. 684,298
Int. Cl.² F036 7/06
U.S. Cl. 60—527 **10 Claims**



4. An apparatus for converting heat energy to mechanical energy comprising:

a load;

synthetic polymer means attached to said load;

said synthetic polymer being an elongated polymer with highly aligned molecules;

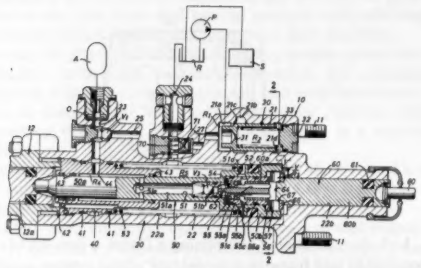
heat means for heating said synthetic polymer;

whereby said polymer contracts when heated and relaxes when cooled, thereby doing work against such load.

4,075,848
HYDRAULIC BRAKE BOOSTER

Atsumi Ueda, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed Feb. 6, 1976, Ser. No. 656,072
Claims priority, application Japan, Feb. 7, 1975, 50-16527
Int. Cl.[2] B60T *13/12*
U.S. Cl. 60—548 7 Claims



1. In combination with a hydraulic brake booster for a vehicle having a brake activating means, a master cylinder for supplying pressure to the wheel cylinders of the vehicle, a hydraulic circuit for circulating pressurized fluid from a fluid pressure source to a reservoir by way of a hydraulic power control device comprising:

a housing for interposition within said hydraulic circuit between said pressure source and said power control device said housing being provided therein with a cylindrical bore and thereon with an inlet port, an outlet port and a drain port respectively in communication with said pressure source, said power control device and said reservoir;

a power piston reciprocable within said cylindrical bore of said housing for forming at one side thereof a power chamber and at the other side thereof a drain chamber in communication with said drain port, said power piston being operatively connectible at one end thereof with said master cylinder and being provided therein with a bore opening toward said power chamber;

a control piston reciprocable within said bores of said housing and said power piston to control interconnection between said power chamber and said drain chamber, said control piston being operatively connectible to said brake activating means;

a first passage means for connecting said inlet port to said power chamber through said bore of said power piston;

a control means for selectively closing and opening the interconnection between said power chamber and said drain chamber in response to movement of said control piston; and

means disposed within said first passage means for closing the communication between said power chamber and said inlet port when said power chamber is communicated with said drain chamber and opening the communication between said power chamber and said inlet port when said power chamber is isolated from said drain chamber by means of said control means;

the improvement which comprises

a second passage means for connecting said inlet port with said power chamber independently of said first passage means;

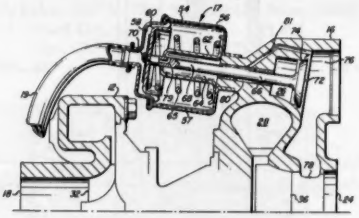
a first flow regulating means disposed within said second passage means for throttling the flow of fluid supplied from said inlet port to said power chamber when said power chamber is isolated from said drain chamber by means of said control means in response to movement of said control piston; and

a second flow regulating means disposed within said second passage means between said inlet port and said first flow regulating means for controlling the flow of fluid from said inlet port to said outlet port and the flow of fluid from said inlet port to said power chamber through said first flow regulating means.

4,075,849
TURBOCHARGER REGULATOR

Neil Ray Richardson, Palos Verdes Estates, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Sep. 1, 1976, Ser. No. 719,633
Int. Cl.[2] F02D *23/00*
U.S. Cl. 60—602 22 Claims



1. A turbocharger for an internal combustion engine having an inlet manifold and an exhaust manifold, said turbocharger comprising:

a compressor housing having an inlet opening and an outlet opening, said outlet opening being connected to the inlet manifold of said engine for supplying charge air to said engine;

a turbine housing having an inlet opening and an outlet opening and a chamber intermediate said inlet and outlet openings forming a bypass conduit therebetween, the inlet opening of said turbine housing being connected to the exhaust manifold of said engine for receiving exhaust gases therefrom;

a center housing connecting said compressor housing with said turbine housing in spaced relationship and having a shaft mounted for rotation therein;

a compressor wheel mounted on said shaft in said compressor housing between said compressor inlet and outlet openings;

a turbine wheel mounted on said shaft in said turbine housing between said turbine inlet opening and said turbine outlet openings;

valve means slidably mounted in an opening in said turbine housing, said valve means having a head portion, and a stem portion received through the openings, said head portion forming selective sealing means for said bypass conduit;

actuator means including a source of control fluid, an actuator housing having a control fluid inlet and a control fluid outlet, flexible wall means separating said actuator housing into first and second chambers and connected to said stem portion of said valve means for selectively moving said valve head portion with respect to said bypass conduit, said first chamber being connected to said fluid inlet and said second chamber being connected to said fluid outlet, said actuator means being connected to said turbine housing and lying intermediate said turbine housing and said compressor housing, means connected between said fluid inlet and said source of control fluid for effecting a pressure differential between said first and second chambers for controlling the position of said valve, inner housing means forming a third chamber within said second chamber of said actuator housing, first conduit means connected between said first chamber and said third chamber, and second conduit means connected between said third chamber and said turbine housing outlet; and

control means for controlling said actuator means in response to engine parameters.

4,075,850

STRIKING TOOL

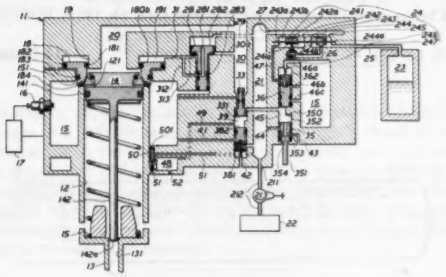
Takashi Nakazato, Maibashi; Chikamitsu Sewada, Takasaki; Shigeyuki Umino, Maebashi, and Mitsuhiro Takatsuru, Takasaki, all of Japan, assignors to Max Co., Ltd., Tokyo, Japan

Filed Nov. 21, 1975, Ser. No. 634,185

Claims priority, application Japan, Jun. 7, 1975, 50-73602; Jun. 28, 1975, 50-90824[U]

Int. Cl.² F01B *29/08*; B25C *1/08*

U.S. Cl. 60—633 **10 Claims**



1. A striking tool of an internal combustion type comprising a valve opening communication between a piston upper chamber of a cylinder, which is assembled in a housing and slidably provides a piston for driving a driver and a combustion chamber disposed around a side wall of said cylinder when an explosion is generated in said combustion chamber.

4,075,851

PENSTOCKS

Frederick Basil Gardner, Redditch, England, assignor to Simon-Hartley Limited, England

Filed Apr. 23, 1976, Ser. No. 679,730

Claims priority, application United Kingdom, May 6, 1975, 19037/75

Int. Cl.² E02B *7/54*

U.S. Cl. 61—22 A **13 Claims**

1. A method of producing a base invert seal in a penstock of the type comprising a frame having an opening therein and a door slidable within the frame across said opening to close same by vertical movement between fixed vertical guide members slidably engaging the side edge regions of said door until its lower end seats on a base member of the frame extending transversely between the lower ends of said guide members and wherein at least one of said guide members at each side forms a compressed resilient vertical seal with the door side region engaged thereby, the method comprising the steps of positively applying a compressive force for compressing the lower end region of each said one guide member to a condition approximating that to which it would be compressed by the lowered door, forming along said base member a pad of resilient material onto which the lower edge of said door will seat when closed with said resilient material bonding to and forming a seal around the compressed lower end region of each said one guide member, and releasing said positive compressive force.

4,075,852

STEEL REINFORCED UNDERGROUND WALL

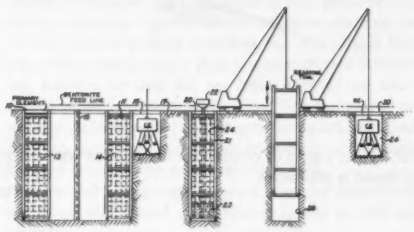
George John Tamaro, Leonia, N.J., assignor to ICOS Corporation of America, New York, N.Y.

Division of Ser. No. 603,982, Aug. 12, 1976, Pat. No. 4,005,582.

This application Jul. 2, 1976, Ser. No. 716,151

Int. Cl.² E02D *5/10, 27/00*

U.S. Cl. 61—35 **2 Claims**



1. A steel reinforced concrete underground wall comprising, a plurality of horizontally elongated steel reinforced concrete primary wall panel elements formed along the line of the wall, the ends of two consecutive of said primary wall elements being spaced apart about double the length of one of said horizontally elongated primary wall elements, each said horizontally elongated primary element being constituted by a lattice work connected flanged steel H-beam pair and a steel reinforcement cage assembly secured to said lattice work in interfitted relation between the facing flanges of the pair of H-beams and concrete, and

a pair of secondary, steel reinforced concrete elements occupying the double space between said primary panel elements, each said secondary element including a steel reinforcing cage which extends between the outer facing vertical channels on each flanged steel H-beam of two consecutive ones of said primary wall panel elements and a vertical H-beam member common to the reinforcing cage of each said pair of secondary, steel reinforced concrete elements, the said facing vertical channels of two consecutive ones of said primary elements serving the functions of (1) excavation guides for excavating the space for said pair of secondary elements to maintain verticality of the secondary elements, (2) interlocking with the steel reinforcing cage and the vertical common H-beam flanges, respectively, and (3) a water stop element and concrete barrier; each said pair of secondary elements having the concrete inserted simultaneously so as to assure verticality of the common vertical H-beam.

4,075,853

SOIL INJECTION MACHINE

Pierre J. de Larosiere de Champfeu, Lisbon, Portugal, assignor to The International Synthetic Rubber Company, Ltd., Southampton, England

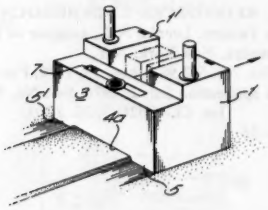
Filed Sep. 29, 1976, Ser. No. 727,776

Int. Cl.² E02D *3/12*

U.S. Cl. 61—36 R **5 Claims**

1. A machine for the injection of a stabilizing liquid into the surface of soil comprising a sledge having a surface compacting base, the base having a forward end and a rear end, a transverse slot located adjacent said rear end, a hollow pessurizable injection bar disposed in said slot, said bar having a

lower face equipped with injection orifices, said lower face of said bar being flush with said compacting surface of said base



so that, in use, a strip of compacted soil bonded with the stabilizing liquid is produced.

4,075,854

Patent Not Issued For This Number

4,075,855

TUNNEL CONSTRUCTION AND TUNNEL TUBBING

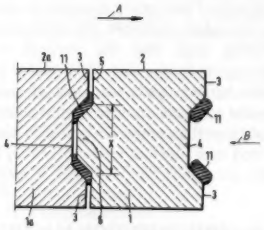
Volker Otto Meldner, Frankfurt am Main, Germany, assignor to Wayss & Freytag Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 14, 1976, Ser. No. 695,938

Claims priority, application Germany, Jun. 21, 1975, 2527743

Int. Cl.[2] E21D *11/05*

U.S. Cl. 61—45 R **13 Claims**



1. A tunnel construction having a longitudinal axis, comprising a plurality of tubbings forming a number of rings arranged side by side along said longitudinal axis, said rings having interfaces between adjacent rings, connecting contact means inserted between said interfaces between tubbings of adjacent rings, said connecting contact means providing the only force transmitting connections between the tubbings of adjacent interconnected tubbing rings, said connecting contact means being located at calculated, predetermined points along said interfaces between the tubbings of adjacent rings, whereby the force transmission between adjacent rings is localized at said predetermined points.

4,075,856

DEVICE FOR CONSECUTIVELY SUPPORTING A DRIFT

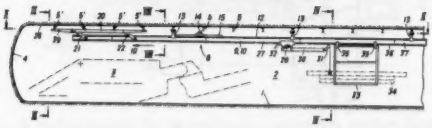
Siegfried Sigott; Alfred Zitz, both of Zeltweg; Wilhelm Althaler, Vienna, and Helmut Wlach, Zeltweg, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Oct. 14, 1976, Ser. No. 732,376

Claims priority, application Austria, Oct. 14, 1975, 7839/75

Int. Cl.[2] E21D *15/582, 15/58*

U.S. Cl. 61—45 C **14 Claims**



1. Device for supporting a drift by means of caps and posts comprising

a breast frame, suspension means carried by said breast frame for suspending said breast frame from already installed caps so as to be movable relative to the installed caps toward the face of the drift, said breast frame including two girders disposed to extend in the longitudinal direction of the drift, and laterally spaced from each other, said girders being mutually connected by a plurality of transverse bars,

lifting beams supported on said breast frame for movement toward and away from said breast frame whereby caps carried on said lifting beams are movable toward the ceiling of the drift,

a rotary crane carried by said breast frame, means for moving said rotary crane on said breast frame toward and away from the face of the drift, said rotary crane having an extensible jib.

4,075,857

SHIELD-TYPE SUPPORT ASSEMBLIES FOR MINE WORKINGS

Burckhardt Elsner; Gunter Lagodka, both of Lunen; Lubomir Plevak, Lunen, Horstmar, and Harry Rosenberg, Ludinghausen, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany

Filed Oct. 22, 1976, Ser. No. 734,934

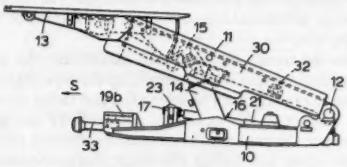
Claims priority, application Germany, Oct. 25, 1975, 2547853

Int. Cl.[2] E21D *15/44*

U.S. Cl. 61—45 D **12 Claims**

1. A shield support assembly comprising three frames arranged in side-by-side relationship, the frames having a floor sill structure carrying hydraulic props capable of bracing the individual frames between the roof and floor of a mine work-

ing, means for guiding the frames for relative shifting displacement, means for effecting relative shifting displacement between the central frame and the outer frames and transverse coupling means extending between the central frame and the outer frames and supported by the central frame, said transverse coupling means being connected to the guide means, wherein the transverse coupling means and the guide means permit relative vertical mobility to occur between the floor sill



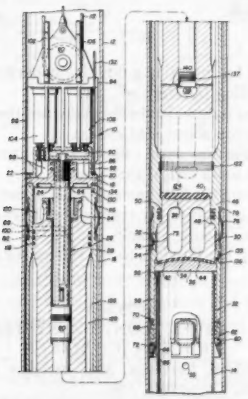
structures of the frames, wherein the transverse coupling means is a transversally extending arm rigidly fixed to the central frame, the guide means comprises guide bars extending in the shifting direction and connected to the ends of the arm and slidably engaging in guide blocks carried by the outer frames, the engagement between the guide bars and guide blocks permitting relative pivotal movement and limited vertical movement therebetween.

4,075,858

HYDRAULIC PILE DRIVING APPARATUS AND METHOD

Leonard L. Frederick, 15 Crestview Terrace, Whippany, N.J. 07981

Filed May 17, 1976, Ser. No. 687,195
Int. Cl.² E02D *7/10*
U.S. Cl. 61—53.5 **34 Claims**



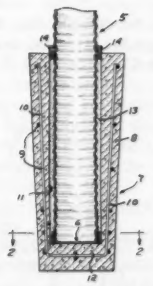
1. A hydraulic pile driving apparatus, which comprises:
an elongated tubular housing member;
closure means for sealing a top end of said tubular member;
an anvil means for sealing an opposite bottom end of said tubular member and transmitting a driving force to the pile, said anvil means being in sealing, sliding contact with said tubular member for limited motion therein, whereby said housing member, closure means and anvil means define a gas-filled chamber;
an elongated ram means, which is slidably disposed within said gas-filled chamber for movement in a generally upward loading direction to a top position and movement in an opposite, generally downward, firing direction to a bottom position, and which includes
a top end surface defining an interior recessed space, and
a bottom end which strikes against said anvil means when said ram means is moved to said bottom position, said ram means being supported by said anvil means when said ram means is at rest;
a piston means, which is mounted to said closure means and extends through said gas-filled chamber into said interior space of said ram means, for defining therein
a loading chamber means, continuously connected to receive high pressure working liquid, for exerting a loading force on an interior bottom-facing surface of said ram means to move same upward to said top position, and
a firing chamber means, alternately connected to receive high pressure working liquid for exerting a firing force on an interior, top-facing surface of said ram means to move same downward to said bottom position, and then connected to exhaust working liquid at low pressure, to permit said loading chamber means to move said ram means in said upward loading direction, the area of said top-facing surface being larger than the area of said bottom-facing surface, so that the net force exerted on said ram means when both said loading and firing chamber means are connected to receive high pressure working liquid is a force to move said ram means in said firing direction;
means for pressurizing said working liquid;
means for delivering high pressure working liquid from an outlet of said liquid pressurizing means to said piston means;
means for returning exhaust, low pressure working liquid from said piston means to an inlet of said liquid pressurizing means; and
means for positioning said housing member relative to the pile to enable said anvil means to transmit said driving force to the pile.

4,075,859

COMPOSITE PILE AND TAPERED CONCRETE TIP THEREFOR

Charles L. Guild, 7 Stone Tower Lane, Barrington, R.I. 02806

Filed Jul. 12, 1976, Ser. No. 704,427
Int. Cl.² E02D *5/30, 5/72*
U.S. Cl. 61—53 **6 Claims**



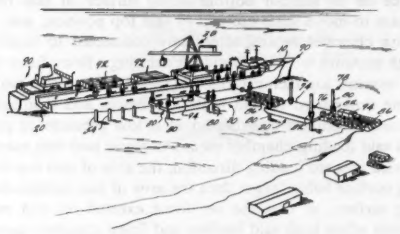
1. A composite pile comprising a tubular pile including a member closing its bottom end, a tapered, reinforced concrete tip, its larger end the upper end, said tip having a central, upwardly opening lengthwise passage and a seat exposed at the bottom of said passage, the cross sectional area and depth of the entire length of the passage being such as to accommodate the bottom end of the pile as a free fit therein with the pile-closing member resting on said seat, and means interposed between said tip and said pile end centering said pile end in said passage and including a fluent body substantially filling the space between said pile end and said tip to complete and ready said pile for driving and to maintain the pile and tip concentric throughout the driving of said pile.

4,075,860

MOBILE SHIP LOADING AND UNLOADING FACILITY

John H. Hansen, Mount Sinai, N.Y., assignor to Delong Corporation, New York, N.Y.

Filed Mar. 15, 1976, Ser. No. 667,014
Int. Cl.[2] E02B *17/00*; B63B *35/40*
U.S. Cl. 61—87 10 Claims



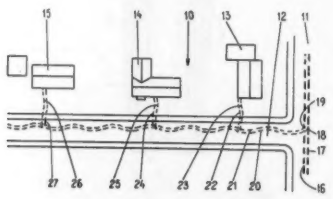
1. A method of establishing a ship loading or unloading pier facility comprising: providing a buoyant vessel having a plurality of jack-up legs insertable in and removable from vertically extending jack holes in the vessel, the vessel having storage space carrying at least one buoyant jack-up platform; floating the vessel with the legs stored in horizontal positions on the deck to an offshore site adjacent a shore line; removing at least one buoyant platform from the vessel and arranging the platform in a floating mode in the water adjacent the vessel; inserting the legs into the jack holes and jacking-up the vessel by means of said legs to render the vessel stationary; floating the platform into a position between the vessel and the shore line and jacking-up the platform; and forming a roadway, which includes the jacked-up platform, between the shore and the vessel.

4,075,861

METHOD OF LAYING PIPES OR CONDUITS IN THE GROUND AND PIPE ARRANGEMENT PRODUCED THEREBY

Filip Bertil Thyberger, and Kurt Olle Ragnvald Lindstrom, both of Vasteras, Sweden, assignors to Granges Essem Aktiebolag, Sweden

Continuation of Ser. No. 300,406, Oct. 20, 1972, abandoned.
This application Jan. 21, 1976, Ser. No. 650,998
Int. Cl.[2] F16L *1/00, 9/14*
U.S. Cl. 61—105 7 Claims



1. Method of laying pipe means in the ground for substantially fluid stress-free conveying of flowing media therethrough at variable temperatures at which the pipe means is subjected to thermal expansion and contraction and for substantially mechanically stress-free thermal expansion and contraction of the pipe means at such variable termpatures, which comprises

laying a precovered pipe means of selective length in a pipe means-receiving ground trench in wave form along the trench for operative connection at a pair of pipe means connecting points spaced apart a linear distance along the trench,

the selective length of the precovered pipe means being sufficient for the precovered pipe means to be distributed along and within such linear distance in wave form for substantially fluid stress-free conveying of flowing media therethrough,

said precovered pipe means being in the form of a pipe means provided with a relatively elastic heat insulating jacket which is capable of being bended into wave form and which in wave form permits relative axial and radial movements of the pipe means with respect to the jacket in response to thermal expansion and contraction of the pipe means, and

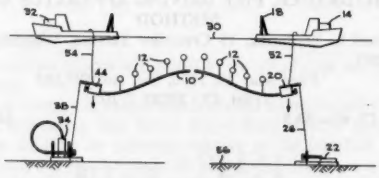
filling in the trench to cover and immobilize the jacket in wave form therein while permitting the pipe means therewithin to execute such relative axial and radial movements with respect to the jacket for substantially mechanically stress-free thermal expansion and contraction of the pipe means along and within the linear distance between the pipe means connecting points.

4,075,862

METHOD AND APPARATUS FOR INSTALLING UNDERWATER FLOWLINES

Thomas J. Ames, Houston, Tex., assignor to FMC Corporation, San Jose, Calif.

Filed Sep. 15, 1976, Ser. No. 723,379
Int. Cl.[2] F16L *1/00*
U.S. Cl. 61—110 11 Claims



1. A method for installing a flowline underwater at a subsea station, comprising the steps of

a. establishing a downhaul cable between the subsea station and a location above said station,

b. attaching the downhaul cable to a flowline mating vehicle connected to an end of the flowline,

c. hauling down the flowline and the flowline mating vehicle to the subsea station by reeling the downhaul cable into the flowline mating vehicle, and

d. connecting the flowline to the subsea station.

4,075,863

FREEZE-HARVEST CONTROL SYSTEM FOR A TUBULAR ICE MAKER

William H. Wilson, Carthage, Mo., assignor to Storm King Products, Inc., Carterville, Mo.

Filed Aug. 23, 1976, Ser. No. 716,596
Int. Cl.[2] F25C *1/06*
U.S. Cl. 62—138 5 Claims

2. An improved cycle control apparatus for a tubular type ice maker having a water level control pan, a hot gas valve solenoid that when energized opens a normally closed hot gas valve to initiate the harvest cycle, a power source, and a water freezing tube, wherein the improvement comprises:

a first switch, normally open, but when closed operably connects the power source to the hot gas valve solenoid;

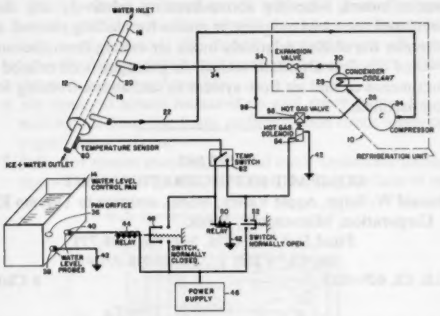
a first relay, when energized, closes the first switch;

a second switch, normally closed, that operably connects the power source to the first relay;

a second relay, that when energized, opens the second switch;

means for detecting a low water level in the water level control pan and for energizing the second relay when said level is above a predetermined level;

a temperature switch, normally closed, operably connected between the juncture of the first relay and the second switch and the juncture of the first switch and the hot gas valve solenoid; and



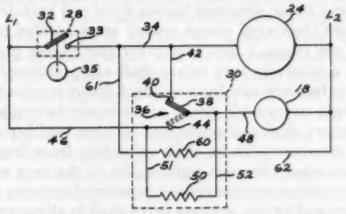
means for detecting the temperature at the discharge end of the water freezing tube and opening the temperature switch for temperatures above a predetermined level.

4,075,864

AIR CONDITIONING FAN CONTROL

Paul D. Schrader, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Apr. 29, 1977, Ser. No. 792,450
Int. Cl.[2] F25D *17/06*
U.S. Cl. 62—180 **6 Claims**



1. In an air conditioner including means for conditioning air, air circulation means for circulating ambient air in association with said conditioning means, temperature responsive means for sensing the condition of air to be conditioned for terminating operation of said air circulating means and said air conditioning means at a preselected low ambient air temperature, control means for controlling the operation of said air circulating means when said temperature responsive means senses temperatures above said preselected temperature, comprising:

said control including switch means having a first position for energizing said air circulating means when the temperature sensed by said temperature responsive means is above said preselected low temperature and a second position for energizing said air circulating means when said temperature responsive means senses said preselected low temperature;

a first actuating means associated with said switch means being operable when the temperature sensed by said temperature responsive means is above said preselected temperature for causing said switch to move to said second position to operate said air circulating means through said control means so that said air circulating means will continue to operate for a predetermined time subsequent to each stoppage of said air condition means after said temperature responsive means senses said preselected low temperature;

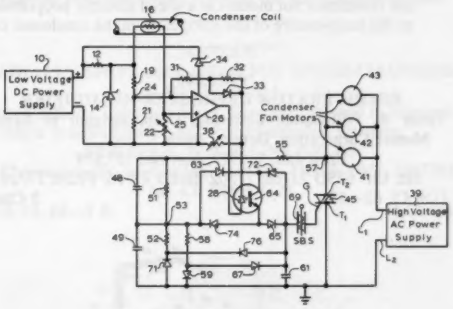
a second actuating means associated with said switch means being operable for actuating said switch means between said first and second position for periodically operating said air circulating means to sample the ambient air by bringing ambient air periodically to said temperature responsive means when the temperature sensed by said temperature responsive means is below said preselected low ambient temperature.

4,075,865

APPARATUS FOR CONTROLLING CONDENSER PRESSURE IN A REFRIGERATION SYSTEM

Frank E. Wills, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 5, 1975, Ser. No. 637,927
Int. Cl.[2] F25D *17/00*
U.S. Cl. 62—183 **1 Claim**



1. A control system for modulating the speed of a plurality of parallel-connected, variable speed fan motors, of an air-cooled condenser coil in a refrigeration system, in response to the temperature of the refrigerant in the condenser coil in order to maintain a substantially constant condenser pressure despite wide variations in condenser cooling air temperature, comprising:

an AC power supply for providing an alternating line voltage of relatively high magnitude;

a triac for coupling said AC power supply to the condenser fan motors to effect simultaneous operation thereof in response to gate current supplied to said triac;

a variable resistance network including a full wave bridge rectifier, having a pair of AC terminals and a pair of DC terminals, and a photosensitive transistor having its collector and emitter connected respectively to the two DC terminals of said bridge rectifier, the resistance between the AC terminals of said network being determined by and being inversely proportional to the amount of light received by said transistor;

a timing capacitor coupled in series with the AC terminals of said bridge rectifier;

a frequency compensated capacitive voltage divider coupled to said AC power supply, via a series-connected resistor, for providing a small replica of the line voltage from said AC power supply, said capacitive voltage divider in conjunction with said resistor constituting a dv/dt suppression circuit across said triac;

means for coupling said variable resistance network and said timing capacitor to said capacitive voltage divider to derive therefrom the small replica of the AC line voltage, said capacitor charging during each half cycle of the alternating voltage in response to charging current flowing through said network and of an amplitude determined by the resistance of said network;

a DC power supply, isolated from said AC power supply, for providing a direct voltage of relatively low magnitude;

a temperature sensing thermistor for sensing the refrigerant temperature in the condenser coil;

means, including a differential amplifier, coupled to said DC

power supply and to said temperature sensing thermistor for developing a control signal which varies as a function of the difference between a desired set point temperature and the actual sensed temperature of the refrigerant in the condenser coil;

a light emitting diode optically coupled to said photosensitive transistor;

means responsive to said control signal for translating current through said light emitting diode to effect illumination thereof in an amount directly proportional to the sensed temperature of the refrigerant, said timing capacitor thereby charging at a rate directly proportional to the sensed temperature;

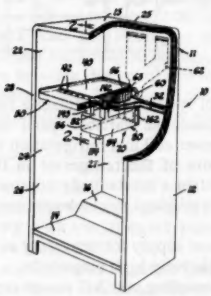
and means coupled to said timing capacitor for supplying gate current to said triac during each half cycle at a phase angle inversely proportional to the amplitude of the charging current, thereby simultaneously driving each of the condenser fan motors at a speed directly proportional to the temperature of the refrigerant in the condenser coil.

4,075,866

REFRIGERATOR DEFROSTER-HUMIDIFIER

Victor A. Williamitis, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 7, 1977, Ser. No. 757,679
Int. Cl.[2] F25D *23/06, 11/02;* **B01D** *47/16;* **F02M** *17/28*
U.S. Cl. 62—274 **3 Claims**



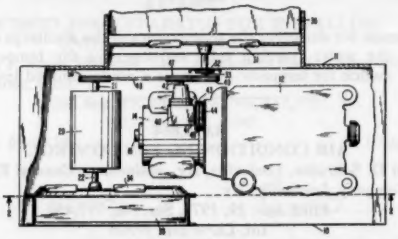
1. A refrigerator comprising, a thermally insulated cabinet having partition means separating said cabinet into an above-freezing food compartment and a below-freezing compartment, evaporator means within said below-freezing food compartment, fan means for circulating air through an air flow system in said refrigerator, said air flow system including an air humidifier-defroster apparatus in said above-freezing food compartment enclosed by housing means, said housing means including a plurality of layered sets of parallel air flow passages formed by corrugated hydrophilic material comprising alternating flat sheets and intermediate corrugated sheets holding the flat sheets in spaced relationship, first header means at one end of said housing means and second header means at the opposite end of said housing means, means for supplying chilled relatively dry air to said first header means, first alternate layered sets of said parallel air passages each having inlet ends connected to said firt header means and outlet ends connected to said second header means, second intermediate layered sets of parallel air passages having inlet ends adjacent said outlet ends of the first sets of air passages and having outlet ends adjacent said inlet ends of the first sets of air passages, means for supplying relatively moist above-freezing air from said above-freezing compartment to the inlet ends of said second intermediate sets of parallel air flow passages, whereby said air flow system causes the circulation of the relatively dry chilled air stream in said alternate sets of passages and the circulation of the relatively moist above-freezing air stream in the intermediate sets of passages to be in opposite directions such that an exchange of moisture between the streams occurs by both diffusion and capillary flow of moisture through the fibrous material from the second intermediate sets of air passages to the first alternate sets of air passages as a result of the moisture vapor pressure difference of the opposite flowing air streams therein, duct means communicating with said second header means, whereby above-freezing relatively dry air is circulated over said evaporator means for chilling thereof, and whereby the chilled relatively moist air exiting from the outlet ends of the first alternate sets of air passages is circulated by duct means of said air flow system to said above-freezing food compartment.

4,075,867

COMPACT REFRIGERATION UNIT

Ronald W. Seipp, Apple Valley, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Dec. 30, 1976, Ser. No. 755,771
Int. Cl.[2] F25B *27/00;* **B60H** *3/04*
U.S. Cl. 62—323 **6 Claims**



1. A compact refrigeration unit comprising, a generally rectilinear frame structure having front and back frame members with their axial planes spaced apart parallel to the long axis of the frame, a first selectively energizable prime mover having a relatively long rotary shaft and positioned along the long axis between said front and back frame members, a second selectively energizable rotary prime mover having a relatively short rotary shaft and positioned between said front and back frame members with its shaft extending from front to back frame member planes at right angles to the long axis of said frame, a refrigerant compressor positioned between said frame members and having a rotary drive shaft in alignment with the shaft of said first prime mover, clutch means to selectively connect the shaft of said first prime mover to the shaft of said compressor, a right angle drive transmission mounted within said frame over said compressor with a first drive shaft in generally axial alignment with said compressor shaft and a second drive shaft extending from front to back frame member planes at right angles to the long axis of said frame, flexible drive means interconnecting said first drive shaft of said transmission and the shaft of said compressor, and flexible drive means interconnecting the shaft of said second prime mover to the second drive shaft of said right angle drive transmission whereby said first prime mover may be energized to drive said compressor with said clutch engaged and said second prime mover may be energized to drive said compressor when said clutch is disengaged.

4,075,868

ICE MAKING MACHINE WITH IMPROVED DRIP SHIELD

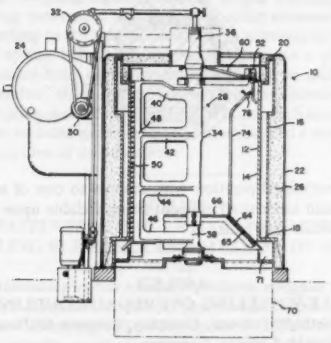
Don S. Bartholmey, Bellevue, Wash., assignor to North Star Ice Equipment Company, Seattle, Wash.

Filed Jul. 8, 1976, Ser. No. 703,518
Int. Cl.[2] F25C *1/14*
U.S. Cl. 62—347 **11 Claims**

1. An ice making apparatus including:

a. a substantially vertical drum having an inner freezing surface;

b. rotor means at least partially disposed within said drum and capable of rotating within said drum;
c. water distributing means communicating with said rotor means for distributing water to at least a portion of the inner surface of said drum;
d. cooling means interconnected with said drum for maintaining the inner surface of said drum at a predetermined temperature below the freezing temperature of water whereby water distributed onto the inner surface of said drum is caused to form ice;
e. ice removal means mounted on said rotor means for removing ice from the inner surface of said drum when said rotor means rotates;
f. deflector means mounted on said rotor means for deflecting water dripping from the inner freezing surface of said



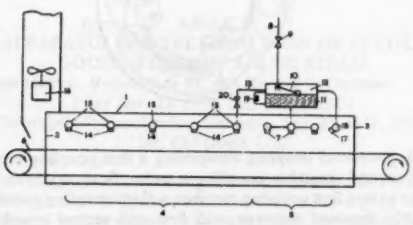
drum, with the outer edge of said deflector means extending more radially outwardly than the inner freezing surface of said drum, said deflector means having a portion removed therefrom so that ice scraped from the inner surface of said drum by said ice removalmeans falls from said drum without striking said deflector means;
g. water receiving means surrounding said drum for receiving water deflected by said deflector means; and
h. tube means communicating with said water distributing means for distributing a portion of the water from said water distributing means to a spray tube means, said spray tube means being annular in shape with a portion removed therefrom, and having a plurality of holes therein for distributing water onto substantially the entire surface of said deflector means.

4,075,869

COOLING OR FREEZING ARTICLES

Robert Alan Fitsall, Wallington, England, assignor to BOC International Limited, London, England

Filed Jan. 27, 1976, Ser. No. 652,743
Claims priority, application United Kingdom, Feb. 10, 1975, 05639/75
Int. Cl.[2] F25D *17/02*
U.S. Cl. 62—374 **11 Claims**



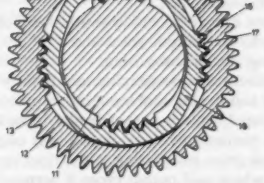
1. Apparatus for cooling articles, which apparatus comprises a tunnel having an inlet end an and outlet end, a gas contacting zone and a liquid contacting zone within said tunnel, conveyor means for moving articles through the tunnel from said inlet to said outlet, said articles passing through the gas contacting zone before passing through the liquid contacting zone, supply means for supplying a vaporisable cryogenic medium initially in the liquid state to the liquid contacting zone to contact said articles passing through that zone and simultaneously vaporising a portion of said medium, gas discharge means in said gas contacting zone for creating a flow of the vaporised portion of said cryogenic medium from the liquid contacting zone through the gas contacting zone, said gas discharge means including a plurality of jets in the gas contacting zone, means connecting the to a supply of pressurised gas, said jets being configured to direct said pressurised gas into contact with said articles passing through said gas contacting zone and to cause turbulence of the said flow of the vaporised portion of the cryogenic medium passing through the gas contacting zone.

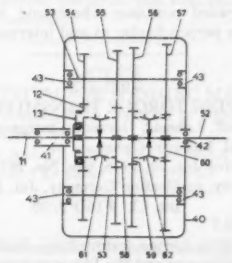
4,075,870

RADIALLY SHIFTABLE GEAR FOR SPEED-CHANGING MECHANISM

Alfred Seifried, Friedrichshafen, Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Oct. 6, 1975, Ser. No. 620,219
Claims priority, application Germany, Oct. 5, 1974, 2447582
Int. Cl. F16H *1/26*
U.S. Cl. 64—9 R **4 Claims**





1. In a gear transmission comprising a main shaft, a transfer gear on said main shaft, a plurality of ancillary shafts peripherally arrayed about said main shaft, and a coacting gear on each of said ancillary shafts in mesh with said transfer gear, the improvement wherein said transfer gear has an externally toothed annular body surrounding said main shaft with clearance, said clearance being occupied by a unitary elastic ring substantially coaxial with said main shaft and said body, said ring having a pair of diametrically opposite outer coupling formations and a pair of diametrically opposite inner coupling formations positively engaging respective complementary formations on the inner surface of said body and on the outer surface of said shaft whereby said body and said shaft are interconnected for joint rotation, said outer and inner coupling formations being peripherally offset from one another by 90°

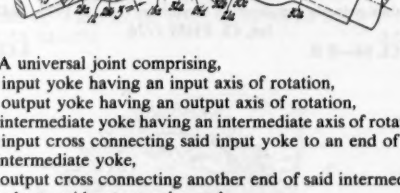
and separated by ring sections freely deformable in said clearance, the combined radial thickness of said ring and either of said coupling formations exceeding the width of the clearance at the respective coupling formation, thereby facilitating radial displacement of said transfer gear relative to said main shaft without disengagement of said coupling formation from said complementary formation.

4,075,871

DOUBLE CARDAN JOINT WITH ELASTOMERIC CENTERING MEANS

Harold J. Burke, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1976, Ser. No. 662,121
Int. Cl.[2] F16D *3/26*
U.S. Cl. 64—17 R **9 Claims**



1. A universal joint comprising,
an input yoke having an input axis of rotation,
an output yoke having an output axis of rotation,
an intermediate yoke having an intermediate axis of rotation,
an input cross connecting said input yoke to an end of said intermediate yoke,
an output cross connecting another end of said intermediate yoke to said output yoke, and
centering means comprising,
first resilient means engaging said input yoke and said input cross and biasing said input cross toward a position where said input cross is perpendicular to said input axis,
second resilient means engaging said output yoke and said output cross and biasing said output cross toward a position where said output cross is perpendicular to said output axis and,
third resilient means engaging said intermediate yoke and said input and output crosses biasing said input and output crosses toward positions where said input and output crosses are perpendicular to said intermediate axis.

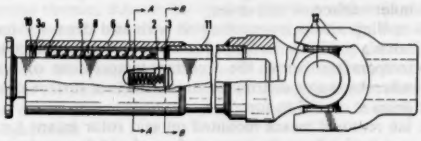
4,075,872

TELESCOPING TORQUE TRANSMITTING SHAFT

Hubert Geisthoff, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Germany

Filed Jul. 20, 1976, Ser. No. 707,105
Claims priority, application Germany, Jul. 22, 1975, 2532674
Int. Cl.[2] F16D *3/06*
U.S. Cl. 64—23.7 **4 Claims**

1. A telescoping torque transmitting shaft particularly for agricultural machinery and the like comprising an inner shaft element having a polygonal cross-section to define a plurality of outer surfaces, an outer tubular shaft element having a plurality of longitudinal extending grooves in the inner face thereof, at least one axially disposed row of torque transmitting balls between said grooves and said surfaces of said inner shaft element, said balls capable of rolling movement between said shaft elements, abutment means comprising a pair of longitudinally spaced annular members on the inner surface of said outer shaft element and having openings therein to receive slidably said inner shaft element, means between said annular members for retaining and guiding said balls, said retaining means comprising a tubular element having a cross-section conforming to the cross-section of said inner shaft element and having a plurality of axially extending slots therein to receive rows of balls, and spring means comprising compression springs at both ends of said tubular retaining member and acting upon said annular members to bias said retaining means



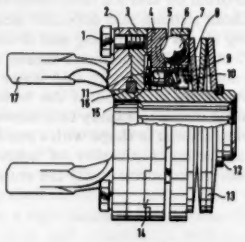
to a predetermined position with respect to one of said shaft elements, said inner shaft element being slidable upon its outer surfaces within said balls.

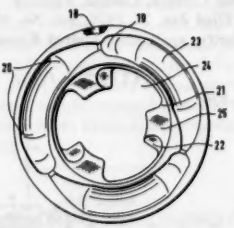
4,075,873

FREE-WHEELING OVERLOAD COUPLING

Hubert Geisthoff, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Germany

Filed Aug. 31, 1976, Ser. No. 719,321
Claims priority, application Germany, Sep. 11, 1975, 2540489
Int. Cl.[2] F16D *43/20*
U.S. Cl. 64—29 **2 Claims**





1. An overload coupling comprising a first coupling member, a second rotatable coupling member fixed axially with respect to said first coupling member, a third coupling member rotatably disposed between said first and second coupling members, inter-engageable torque transmitting means on said second and third coupling members, said third coupling member being axially displaceable between a torque transmitting

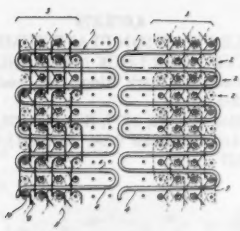
position and a disengaged position with respect to said second coupling member, a plurality of torque transmitting roller elements circumferentially spaced in said first coupling member and means for resiliently urging said roller elements toward said third coupling member, a radial face of said third coupling member having a plurality of arcuate recesses therein receiving said roller elements and each recess having a torque transmitting portion and a free-wheeling portion, the axial distance between said torque transmitting and free-wheeling portions being greater than the axial distance between the engaged and disengaged positions of said third coupling member such that when said torque transmitting roller elements are in the free-wheeling portions of said recesses said second and third coupling members are disengaged, and spring biased means engageable with said third coupling member for urging said third coupling member into its torque transmitting position during movement of said torque roller elements from the free-wheeling to the torque transmitting portions in said recesses, said spring biased urging means comprise a plurality of spring-loaded bolts circumferentially spaced on said first coupling member, there being second arcuate recesses on said third coupling member receiving said bolts, each second recess having an inclined guide surface at one end and a torque transmitting portion at its other end.

4,075,874

SLIDE-FASTENER STRINGER HALF WITH KNITTED-IN COUPLING ELEMENTS AND METHOD OF MAKING SAME

Helmut Heimberger, Locarno, Switzerland, assignor to Optilon W. Erich Heilmann GmbH, Cham, Switzerland

Filed Sep. 30, 1976, Ser. No. 728,034
Claims priority, application Germany, May 20, 1976, 2622529
Int. Cl.[2] D04B *23/08, 23/10*
U.S. Cl. 66—192 **2 Claims**



1. A slide-fastener stringer half comprising a full tricot ground knit tape and a monofilament coupling element on said tape having a series of turns each having a pair of shanks and projecting transversely beyond a longitudinal edge of said tape, and securing warp filaments warp-knitted into said tape and overlying said shanks, said turns each comprising a pair of such shanks lying along alternate courses of said tape and said warp filament constituting warp pillars chain-knitted into said tape at the remaining courses.

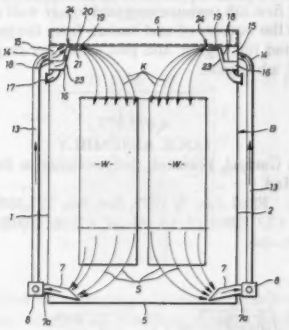
4,075,875

APPARATUS FOR TREATING WEBS OF TEXTILE GOODS WITH HOT AIR OR STEAM

Klaus Heidan, Roonstrasse 84, 415 Krefeld 1, Germany

Filed Apr. 21, 1976, Ser. No. 679,079
Claims priority, application Germany, Apr. 23, 1975, 2517972
Int. Cl.[2] D06B *3/12*
U.S. Cl. 68—5 D **4 Claims**

1. An apparatus for treating in a continuous manner webs of textile goods which includes: a container having an upper portion as well as a major width and length, supporting means arranged in said container for supporting webs of textile material to be treated by a gaseous treating medium, slot-nozzle means arranged in the upper portion of said container and extending at least over the major width and length of said container, said supporting means being provided for the textile material having a first section adjacent said nozzle means and also having a second section remote from said nozzle means, said nozzle means being adapted to receive and release a gaseous treating medium onto said first section for treating a web of materials whenever placed correspondingly on said supporting means, said nozzle means being provided with first inlet means connectable to a supply of a fresh gaseous treating medium and also being provided with second inlet means, and means for withdrawing gaseous treating medium from said second section whenever treating medium is released by said nozzle onto said first section and for conveying said withdrawn gaseous



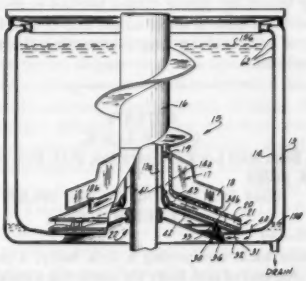
treating medium to said second inlet means, said means for withdrawing gaseous treating medium from said second section including blower means communicating with said nozzle means, said nozzle means having associated therewith and communicating with first accumulating and distributing chamber means for receiving treating medium withdrawn from said second section and also having associated therewith and communicating with said accumulating and distributing chamber means for receiving fresh treating medium from said first inlet means, said nozzle means including two substantially parallel outer walls and a first partition, said first and second accumulating and distributing chamber means being separated from each other by a second partition, said first partition merging with said second partition.

4,075,876

FILTER SYSTEM FOR WASHING MACHINE

Clark I. Platt, St. Joseph, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Apr. 27, 1976, Ser. No. 680,675
Int. Cl.[2] D06F *13/02, 39/10*
U.S. Cl. 68—18 F **16 Claims**



1. In a washing machine of the vertical axis type having a tub having a lower wall for containing wash liquid, a basket

mounted in the tub on said vertical axis for containing articles to be washed and having a lower wall spaced adjacent said wall of the tub, and pump means for circulating wash liquid to said basket from said tub; filter means for filtering the circulating wash liquid, said filter means comprising:

a filter ring being located entirely outside said basket and extending between said lower wall of said tub and said lower wall of said basket and being substantially circumferentially continuous about said axis to define annularly continuous first and second tub regions outside said basket wall,

said filter ring including a plurality of teeth for filtering suspended foreign particles from liquid passing from said second to said first tub region,

said circulating liquid flowing generally along a path in said first tub region along said lower wall of said basket, into the interior of said basket, from the basket into said second tub region, and past said filter ring back to said first tub region.

4,075,877

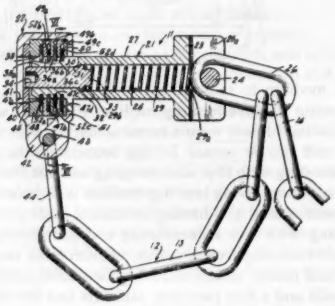
LOCK ASSEMBLY

James Van Gompel, Fremont, Ind., assignor to Brammall, Inc., Angola, Ind.

Filed Jan. 7, 1977, Ser. No. 757,655

Int. Cl.[2] E05B *15/16, 35/04, 67/06;* **E00B** *67/36*

U.S. Cl. 70—34 **13 Claims**



1. A lock assembly comprising, a locking post having a first securing portion at one end, a longitudinal bore, at least one rib transverse to the longitudinal axis of and near the other end of the post, and at least one longitudinal slot in the locking post intersecting said at least one rib, a locking cap receivable over said other end of the post, a second securing portion on the locking cap, a key aperture in the cap, a locking means positioned in the locking cap and spring biased to engage said at least one rib of the locking post when said cap is received over said other end of the locking post, and in which said locking means comprises a locking ring having a central aperture through which said locking post may be received, said locking ring being biased by spring means into an eccentric position with respect to a central longitudinal axis of said locking post, a portion of said locking ring intersecting the locking post longitudinal slot.

4,075,878

CABLE LOCK

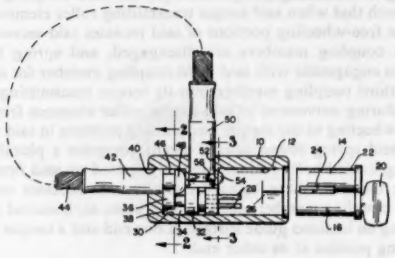
Walter E. Best, Best Lock Corporation, P.O. Box 103, Indianapolis, Ind. 46206

Filed Jun. 10, 1976, Ser. No. 694,685

Int. Cl.[2] E05B *67/06*

U.S. Cl. 70—49 **18 Claims**

1. A cable lock, comprising a lock body, a core chamber formed at one end of said body for receiving a lock core having a key-actuated key plug and a tumbler pin housing projecting radially of said key plug, said chamber having a first portion adapted to contain the key plug of the core and a side portion to contain the pin tumbler housing, a bore extending inward beyond said chamber and a rotary bolt mounted therein in coaxial relation with the key-plug of the core and connected for operation by such key plug, an axial first cable-receiving bore extending inward from the opposite end of the body in parallel overlapping relation with said bolt-receiving bore and in general axial alignment with said chamber side portion, for receiving a cable end member, a second cable-receiving bore formed in said body transversely of and generally coplanar



with and axially between said side portion and said first cable-receiving bore, a cable having a first end member thereon secured in said second cable-receiving bore and a second end member on said cable formed for releasable engagement in said axial first cable-receiving bore, said releasable end member and bolt being shaped for interlocking engagement, the bolt having a normal locked position in which it locks such end member in the body and having a key-actuated release position in which it releases such end member for withdrawal from the body.

4,075,879

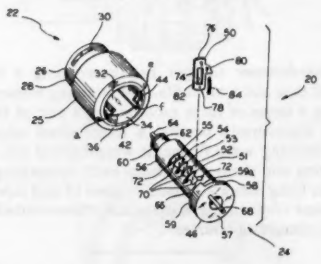
MULTIPLE FUNCTION PLATE TUMBLER-TYPE CYLINDER LOCK MECHANISM

Walter S. Christopher, Park Ridge, Ill., assignor to Chicago Lock Co., Chicago, Ill.

Filed Jun. 22, 1977, Ser. No. 808,971

Int. Cl.[2] E05B *9/04, 29/02, 35/08*

U.S. Cl. 70—337 **12 Claims**



1. A cylinder lock mechanism which comprises:

a barrel having a plurality of longitudinal internal splines therearound adapted for receiving tumbler ends,

means providing at least three internal circumferentially extending tumbler movement paths on said barrel having proximal ends disposed in a first one of said splines and terminating at distal ends in respectively different ones of said splines,

a key plug assembly rotatably mounted in said barrel and including a key plug and a plurality of spring-pressed plate tumblers mounted in said plug in a longitudinal series,

said tumblers being mounted for reciprocal transverse movement upon insertion and withdrawal of a bitted key with

opposite tumbler ends projecting alternately from opposite sides of said plug,

first ones of said tumbler ends being spring-pressed to project outwardly for reception in a second one of said splines to secure the plug assembly initially in the absence of a key, said second spline being diametrically opposed to said first spline,

opposite second ones of said tumbler ends being adapted to be projected outwardly and received in said first spline when a key is inserted for the purpose of freeing said plug assembly for rotation,

different ones of said second tumbler ends registering with respective movement path proximal ends whereby when such tumbler ends are projected outwardly they may travel in the movement paths between the proximal and distal ends thereof, and

means adjacent to at least one end of each movement path adapted for engagement with the tumbler end traveling in the path to prevent travel thereof beyond such path end,

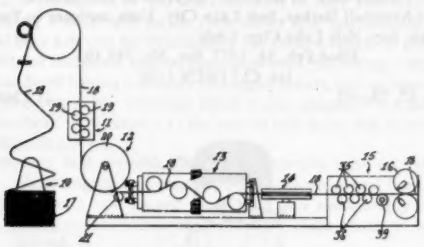
whereby a plurality of different keys may be employed for rotating said plug assembly with each key rotating the assembly to a different limited extent, said keys each engaging a different one of said tumblers having a second end registering with a movement path to cause such end to project into the movement path and thereby limit rotation of the plug assembly.

4,075,880

MACHINE FOR CONTINUOUSLY COLD WORKING STEEL BAR

William Raeburn Copeland, Johannesburg, South Africa, assignor to Reinforcing & Allied Industries (Proprietary) Limited, Johannesburg, South Africa

Filed Nov. 12, 1976, Ser. No. 741,410
Claims priority, application Australia, Nov. 14, 1975, 3970/75
Int. Cl.² B21F 7/00
U.S. Cl. 72—64 **9 Claims**



1. A method of cold working an elongated steel length by imparting a torsional force to such length including the steps of:

feeding the elongated length into a first gripping formation, such gripping formation restraining the steel length from rotating about an axis along its line of feed,

feeding the elongated length into a second gripping formation,

causing the second gripping formation to rotate about an axis substantially axially aligned to the line of feed thereto of the elongated steel length,

continuously feeding the length of steel through the gripping formations thereby causing the second gripping formation to impart continuously the requisite degree of torsion to the steel length, and

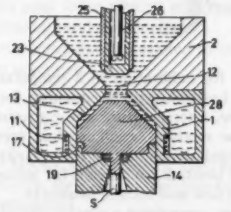
feeding the steel length from the second gripping formation to a third gripping formation downstream of the second formation, such third formation being non-rotatable about the axis of the line of feed and restraining the steel from rotating about an axis along the line of feed thereto of the steel length, such that relative the second and third gripping formations a rotation occurs counter the rotation between the first and second gripping formations such that between the second and third gripping formations a continuous counter torsional force is imparted into the steel length.

4,075,881

METHOD OF AND DEVICE FOR MAKING RODS, TUBES AND PROFILED ARTICLES

Alfred Kreidler, Zurich, Switzerland, assignor to Metall-Invent S.A., Zug, Switzerland

Filed Dec. 4, 1975, Ser. No. 637,817
Claims priority, application Germany, Dec. 5, 1974, 2457423
Int. Cl.² B21C 33/02
U.S. Cl. 72—270 **21 Claims**



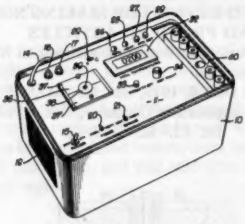
1. The method of extruding a continuous extrusion from molten material, comprising confining a mass of said material between two relatively movable members, the first member having a receiving compartment in which said mass is confined with the second member within said compartment, cooling the material in said compartment to a plastic state, one of said members having an inlet, the other member having an extrusion opening opposite said inlet and supporting said material and being relatively movable toward and away from said inlet, closing said inlet and moving said members relatively to move said second member inwardly into said compartment, exerting pressure on said mass and extruding a portion of said mass adjacent said other member through said extrusion opening, opening said inlet and moving said second member outwardly with said plastic mass and admitting a supply of said molten material into said compartment to form a layer of molten material on said plastic mass adjacent said inlet, closing said inlet to confine said material in said compartment and cool said layer, and repeating said cycle of moving said second member inwardly and outwardly relatively to said compartment while extruding a portion of the plastic mass in said compartment of each cycle.

7. An apparatus for producing strands in the form of rods, tubes and profiled articles, which includes: a first housing section comprising a casting funnel adapted to be filled with a melt from which the strands to be produced are made, a second housing section comprising a receiving compartment for receiving melt from said casting funnel, conduit means establishing communication between said casting funnel and said receiving compartment, stopper to means operable selectively to move for interrupting communication between said casting funnel and said receiving compartment, pressing die means forming a plunger slidably extending into said compartment and operable to support a bar of the material of said melt in a thermal plastic condition and with each inward stroke of said die means relative to said compartment to extrude from said bar a section of a strand, a tool arranged on said die for shaping the cross section of said strand section, a thin wall bounding at least in part the inner space of said compartment and adapted to be cooled from the outside while being made of heat conducting material, and means for transmitting pressure force and adapted only during the pressing stroke to engage said wall for supporting the same.

4,075,882
TEMPERATURE CALIBRATION SYSTEM

Bradley C. Waldron, Canoga Park, Calif., assignor to King Nutronics Corporation, Woodland Hills, Calif.

Filed Feb. 4, 1977, Ser. No. 765,732
Int. Cl.[2] G01K *15/00*
U.S. Cl. 73—1 F 22 Claims



1. In a system for calibration of a temperature probe and including a first heatsink with an opening for receiving the temperature probe, a temperature sensing resistor, a plurality of thermo-electric modules, each module serving as a heat source and a heatsink depending on the polarity of the applied voltage, a second heatsink, and means for mounting said modules between said first and second heatsinks,

the improvement comprising a control circuit for selectively connecting said modules to an electric power source with one polarity and with the opposite polarity, said control circuit including in combination:

a first bridge arm with said temperature sensing resistor connected therein, and providing a first output;

a second bridge arm with a temperature set resistor connected therein, and providing a second output;

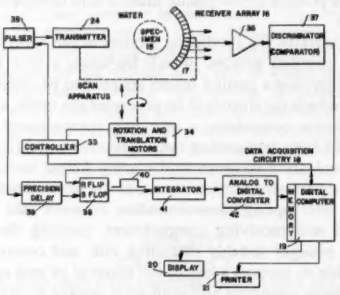
a comparator circuit having said first and second outputs as inputs and providing a power output; and

power switching means having said power output as an input for connecting said modules to the power source.

4,075,883
ULTRASONIC FAN BEAM SCANNER FOR COMPUTERIZED TIME-OF-FLIGHT TOMOGRAPHY

Gary H. Glover, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 20, 1976, Ser. No. 716,109
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—620 11 Claims



1. An ultrasonic scanner for computerized time-of-flight tomography comprising

a scan apparatus having a rotational axis and including a generally sector-shaped tank having openings in opposing end walls, a transmitter transducer with an attached divergent lens mounted in one opening for producing a planar ultrasound fan beam, and an arcuate receiver transducer array mounted in the other opening and comprising multiple receiver transducers for individually detecting acoustic pulses propagating along divergent paths through a liquid bath and a tissue specimen immersed therein,

means for rotating said scan apparatus, and means including a pulser circuit for generating start electrical pulses for periodically exciting said transmitter transducer and initiating generation of multiple acoustic pules approximately at each of a large number of equally spaced anagular positions of said scan apparatus,

data acquisition circuit means operative approximately at each angular position for deriving digital projection output data indicative of acoustic pulse propagation delay times upon detection at individual receiver transducers, the ensemble of projection output data for the respective angular positions of the scan apparatus forming transmission time-of-flight projections to be used in combination to reconstruct velocity distributions at known coordinates in a specimen layer

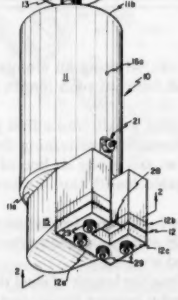
said data acquisition circuit means including a plurality of parallel processing channels, substantially smaller in number than the number of receiver transducers, that are switched in sequence among sets of said receiver transducers between generation of successive acoustic pulses at the respective angular positions, each channel comprising pulse height discriminator means for generating a delay time stop signal upon detection of acoustic pulses at a coupled receiver transducer, and further comprising a digital timing circuit including a digital clock that is effectively enabled by the respective start electrical pulse and stopped by the corresponding delay time stop signal to derive said projection output data, a register coupled to each timing circuit for temporarily receiving said projection output data, and

a memory unit for storing said projection output data.

4,075,884
FRACTURE SPECIMEN LOADING MACHINE

Lynn Marshall Barker, Salt Lake City, Utah, assignor to Terra Tek, Inc., Salt Lake City, Utah

Filed Feb. 14, 1977, Ser. No. 768,193
Int. Cl.[2] G01N *3/36*
U.S. Cl. 73—91 21 Claims



1. A fracture specimen loading machine comprising,

a source of fluid under pressure;

fluid transfer means connected to said source of fluid under pressure for receiving fluid therefrom;

envelope-shaped pressure bag means connected to said fluid transfer means to receive fluid therefrom, to expand as the fluid volume therein increases;

flow control means for controlling the volume of fluid within said pressure bag; and

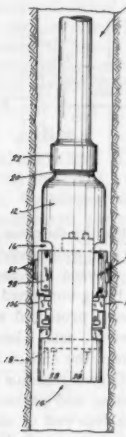
sensor means connected to said fracture specimen loading machine for sensing fluid pressure within said pressure bag.

4,075,885

ROCK BOREHOLE SHEAR TESTER

Richard L. Handy, Des Moines; Leon E. Girard, Ames; Bruce R. Roorda, Marshalltown, all of Iowa, and John M. Pitt, Woodridge, Va., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Feb. 23, 1977, Ser. No. 771,360
Int. Cl.[2] E21B *49/00*
U.S. Cl. 73—88 E **16 Claims**



1. A method of in situ determination of rock properties by forming a bore hole in the rock under test, introducing into said bore a device for determining the shear strength of rock at different measured applied normal stresses, including a hinged shear head having a plurlity of hinged points, and at least one of two oppositely mounted shear plates adaptable for lateral movement with respect to the axis of said bore, the invention comprising,

moving said movable shear plate laterally until said shear plates engage and grip opposite surfaces of said bore,

maintaining said hinged shear head in a substantially rigid configuration while said movable shear plate is being moved,

exerting a shearing force on said body means in a direction parallel to the axis of said bore to exert a shearing force to the opposite surfaces of said bore through said shear plates, and simultaneously releasing said shear head from its rigid configuration to permit limited deformation thereof while said shearing force is being applied, and measuring the shearing resistance of the rock engaged by said shear plates.

4,075,886

FRACTURE TOUGHNESS TEST METHOD

Lynn M. Barker, Salt Lake City, Utah, assignor to Reed Tool Company, Houston, Tex.

Continuation of Ser. No. 718,994, Aug. 30, 1976, abandoned. This application Apr. 20, 1977, Ser. No. 789,318
Int. Cl.[2] G01N *3/20*
U.S. Cl. 73—88 R **12 Claims**

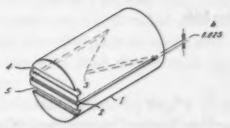
1. A method of measuring the fracture toughness of hard brittle materials comprising

forming a short rod-shaped test specimen,

cutting slots in said specimen in a single plane intersecting to form a single slot having an internal V shape,

applying an opening force at the open end of said single slot to form an initial short crack at the apex of said V,

applying slowly increasing forces to the slotted end of said specimen perpendicular to said slot in opposite directions tending to open said slot and propagate said crack, and



measuring the peak force applied in propagating said crack prior to breaking said specimen,

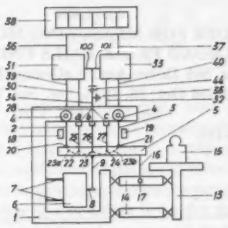
said peak force being linearly related to the fracture toughness of the specimen.

4,075,887

MASS AND FORCE METER

Mario Gallo, Zurich, Switzerland, assignor to Wirth, Gallo and Company, Switzerland

Filed Dec. 22, 1975, Ser. No. 643,326
Claims priority, application Switzerland, Jan. 23, 1975, 00967/75
Int. Cl.[2] G01L *1/10*
U.S. Cl. 73—141 R **3 Claims**



3. A mass and force meter comprising a frame, a digital evaluation and display device, two pre-tensioned electrically conductive strings, each having one end thereof fixed electrically insulated to said frame, a force distributor, the other end of said strings being connected electrically to said force distributor, an exciter comprising electrical circuits for each string controlling an alternative current, three electric conductors in said circuits being electrically connected to said force distributor, one of said electric conductors closing said circuits of both said exciters, each of the other two of said three electrical conductors closing a respective circuit of each of said electrical circuits, a magnetic field extending over a part of the length of said strings, said alternative current exciting said strings to transversal vibrations, first and second transmission elements for transmitting to said strings a pre-tensioning force and a force proportional to the mass or force to be measured respectively, an electrically insulating element at each end of said transmission elements, said insulating elements being connected to said force distributor, which is thereby electrically insulated from said frame, the other ends of said transmission elements being operatively connected to receive their respective forces, means for applying to the evaluation and display device resultant frequency variations caused by the variations of tension of said strings due to the application of the force proportional to the mass or force to be measured.

4,075,888

MEASUREMENT OF UNDULATORY WEAR ALONG RAILROAD TRACKS

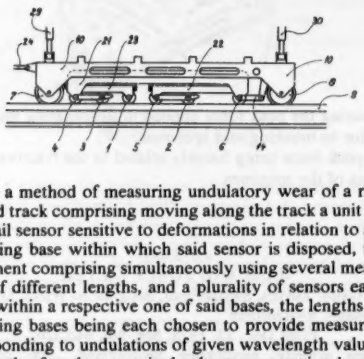
Fritz Buhler, Ecublens, Switzerland, assignor to Les Fils d'Auguste Scheuchzer S.A., Switzerland

Filed Apr. 20, 1976, Ser. No. 678,666

Claims priority, application Switzerland, Apr. 23, 1975, 5186/75

Int. Cl.[2] B61K *9/08*

U.S. Cl. 73—146 **13 Claims**



1. In a method of measuring undulatory wear of a rail of a railroad track comprising moving along the track a unit including a rail sensor sensitive to deformations in relation to a given measuring base within which said sensor is disposed, the improvement comprising simultaneously using several measuring bases of different lengths, and a plurality of sensors each disposed within a respective one of said bases, the lengths of said measuring bases being each chosen to provide measurements corresponding to undulations of given wavelength values, and the length of each successively shorter measuring base being related to the length(s) of the longer one(s) to include measurements of undulations of wavelength values not provided by said longer one(s).

4,075,889

RECORDER FOR MEASURING MOVEMENT OF RAILROAD TRACK RAILS UNDER LOAD

Paul T. Jones, 505 Dover Ave., LaGrange Park, Ill. 60525

Filed Oct. 26, 1976, Ser. No. 735,404

Int. Cl.[2] G01L *5/20*

U.S. Cl. 73—146 **10 Claims**

1. Apparatus for recording relative movement under load between opposing rails of a railroad track comprising,

body means disposed between said opposing rails, and

means for securing said body means to each of said rails in a manner to permit normal passage of a vehicle over the rails,

said body means including displacement indicia means for showing maximum extent of relative movement of said opposing rails between no load condition and load condition created by the passing of a vehicle over said rails.

4,075,890

DEVICE FOR DETECTING LEVEL OF MOLTEN METAL SURFACE WITHIN A CONTINUOUS CASTING MOLD

Takeshi Iwasaki, Tokyo; Yasuo Fujikawa, and Kunimasa Sasaki, both of Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

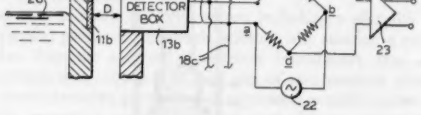
Filed Dec. 2, 1976, Ser. No. 747,250

Claims priority, application Japan, Mar. 31, 1976, 51-34278

Int. Cl.[2] G01F *23/22;* **H01F** *27/16*

U.S. Cl. 73—295 **4 Claims**

1. In a device for detecting the level of the molten metal surface within a continuous casting mold having a detector element consisting of a body of a thermosensitive magnetic material, the magnetic properties of which vary in response to a temperature variation mounted at an appropriate position on a side wall of the continuous casting mold, and an electromagnetic coil for detecting the magnetic flux in said detector element and contained within a detector box mounted in a water jacket surrounding said mold at a position opposed to said detector element, so that a molten metal surface level within the mold can be detected by detecting a change in the magnetic properties of said detector element by means of said electromagnetic coil, the improvement comprising means for detachably mounting said detector box in the water jacket, water supply inlet and outlet means in said detector box for guiding cooling water through said detector box for cooling the electromagnetic coil within the detector box, a protective casing slidably mounted in a side wall of said detector box toward the mold for movement toward and away from the mold, said electromagnetic coil being contained entirely within said protective casing for being protected against electrical contact with the cooling water, said casing having an extension thereon projecting from the end of said electromagnetic coil toward the mold, and spring means engaging said protective casing for spring-biasing said protective casing towards said mold for keeping the free end of said extension against said mold, whereby a predetermined distance is maintained between the outer side wall of the mold and said protective casing.



4,075,891

SELF-LEVELING STATIC WHEEL BALANCER

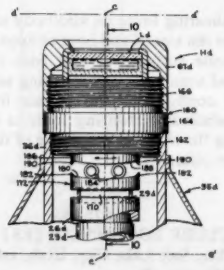
Thomas E. Roberts, Jr., Saratoga, Calif., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 633,779, Nov. 20, 1975, Pat. No. 4,041,781.

This application May 6, 1977, Ser. No. 794,581

Int. Cl.[2] G01M *1/04*

U.S. Cl. 73—483 **2 Claims**



1. In a wheel balancer of the type comprising a post having a generally vertical axis, means for supporting said post on the floor, a wheel balance head having means for mounting and centering a wheel to be balanced in a plane that is normally horizontal, a level on said head, and universal pivot means for mounting said balance head on said post for freely accommodating tilting of said balance head plane relative to said post about a pivot point in response to wheel unbalance, the pivot

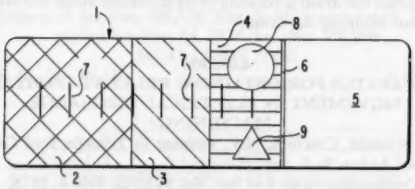
point of said balance head plane being coincident with the axis of said post when the post axis is vertical; the improvement wherein said pivot means comprises an anvil on the upper end of said post, a concave cylindrical bearing surface formed on the upper face of said anvil, a first set of equal diameter cylindrical rollers on said concave anvil surface; an intermediate swivel block having a lower face formed with a convex cylindrical surface supported by said rollers, the axes of said cylindrical surfaces being coincident to form a common axis that is perpendicular to and intersects the axis of said post, the axes of said rollers being parallel to that of said cylindrical surfaces; said swivel block having an upper face formed with a concave cylindrical surface, a second set of equal diameter rollers on said concave swivel block surface, and a mounting block on said balancing head, said mounting block having a lower surface formed with a convex cylindrical surface supported by said second set of rollers; the axes of said latter named cylindrical surfaces being coincident to form a common axis that is perpendicular to and intersects the common axis of said first named cylindrical spherical surfaces at the axis of said post.

4,075,892

INDICATING ARRANGEMENT FOR A DISTANCE WARNING INSTALLATION

Manfred H. Burckhardt, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 19, 1976, Ser. No. 668,422
Claims priority, application Germany, Mar. 20, 1975, 2512144
Int. Cl.[2] B60K *35/00*; G01P *15/00*
U.S. Cl. 73—495 **14 Claims**



1. An indicating arrangement with an indicating means for a distance-warning system in motor vehicles that includes a measuring and evaluating means for determining the distance of the vehicle to an obstacle disposed in front thereof and for determining the approach velocity to this obstacle, characterized in that the indicating means includes a scale means having deceleration values marked thereon, means for obtaining a signal from the values determined by the measuring and evaluating means representing the braking deceleration necessary for avoiding a collision and means for reproducing said braking deceleration as desired value indication on the scale means with the deceleration values marked thereon.

4,075,893

RADIALLY MOVING TRIGGER MECHANISM AND TRANSMISSION OVERSPEED INHIBITOR USING SAME

Franklin O. Koch, Jr., Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

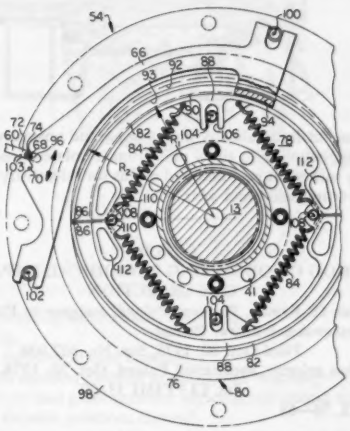
Filed Feb. 25, 1976, Ser. No. 661,087
Int. Cl.[2] F16H *5/42, 25/08, 53/00*; G01P *3/18*
U.S. Cl. 74—3 **7 Claims**

1. A trigger mechanism providing stepwise linear motion responsive to a shaft rotating above a predetermined rate, comprising:

a rotating shaft having a collar thereabout attached to rotate therewith;

a plurality of arcuate cams mounted within said collar to rotate therewith, each normally biased with the ends of the arcs thereof adjacent said collar and the mid points of the arcs thereof spaced away from said collar towards said shaft, said mid points of said arcs being forced centrifugally to adjacent said collar when said shaft rotates above a predetermined rate, each of aid cams having channel means therein, each of said cams fitting against a respective adjacent cam end to end to form a generally circular arrangement thereof and of said channel means, said circular arrangement of said channel means defining a first circular path in said cams at a normal shaft rotation rate up to said predetermined rate a first radial distance from said shaft and a second circular path in said cams at a second radial distance from said shaft above said predetermined shaft rotation rate;

non-rotating cam-follower means having a tang extending therefrom into said first circular path at said normal shaft rotation rate and into said second circular path above said



predetermined shaft rotation rate, said cam-follower means being constrained to shift laterally with shifting of said tang from a respective one to a respective other of said first and second circular paths and providing a pair of detent positions separated by a distance generally equal to said lateral shift a first of which is further from said shaft and a second of which is closer to said shaft;

a rod having a first end extending outwardly from said cam-followeer means away from said shaft and a second end contacting a respective one of said first and second detent positions; and

means biasing said second end of said rod toward said respective one of said first and second detent positions and thereby indexing said tang in said first circular path at said normal shaft rotation rate and in said second circular path at said predetermined shaft rotation rate.

4,075,894

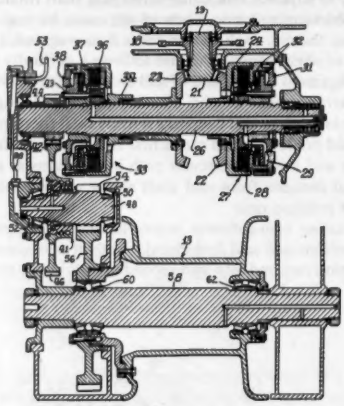
WINCH DRUM HYDRAULIC DISCONNECT

Henry T. Therkildsen, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 23, 1976, Ser. No. 753,679
Int. Cl.[2] F16H *37/00*
U.S. Cl. 74—15.69 **9 Claims**

1. In a drum rotating apparatus which comprises an input gear, means for selectively drivingly rotating said input gear about its axis in a first and a second direction, a transfer gear meshing with said input gear and driven thereby, a shaft rotatably driven by said transfer gear and having gear engaging means thereon, an output gear meshing with said gear engaging means and driven thereby and a drum secured to said output gear to rotate therewith, an improvement comprising:

a normally engaged linearly movable ring coupling intermediate said transfer gear and said shaft; and



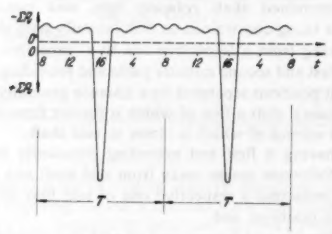
means for hydraulically disengaging said normally engaged ring coupling to allow said drum to rotate unencumbered by said input gear and said means for selectively drivingly rotating said input gear.

4,075,895

METHOD OF OBTAINING PERIODICAL IMPACTS IN ONE DIRECTION

Krystian H. Eyman, Warsaw, Poland, assignor to Politechnika Warszawska, Warsaw, Poland

Filed Oct. 30, 1975, Ser. No. 627,038
Claims priority, application Poland, Oct. 30, 1974, 175226
Int. Cl.[2] F16H *33/00*
U.S. Cl. 74—61 **2 Claims**



1. A method of producing periodic shocks in one direction comprising aligning at least three eccentric weights in the direction of desired shock, rotating the weights to induce centrifugal forces, and establishing different speeds of rotation of the weights in a sequence of cardinal numbers which as a result of summation of centrifugal forces, a desired shock is produced in one direction for every phase of complete revolution of the most slowly rotating eccentric weight.

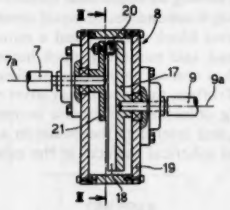
4,075,896

MECHANISM FOR THE VARIABLE-SPEED DRIVE OF THE AUTOMATIC SHEET FEEDER DRUM

Giorgio Pessina, and Aldo Euclide Perobelli, both of Via Arborina 2, Paderno Dugnano, Italy

Filed Feb. 24, 1976, Ser. No. 661,014
Int. Cl.[2] F16H *21/14*
U.S. Cl. 74—69 **3 Claims**

1. In an automatic sheet feeder, the combination of:
A. a feed drum,
B. grippers carried by the drum and shiftable between a sheet releasing idle position and a sheet gripping operative position,
C. means mounting the drum for rotation about its center,
D. means rotatably driving said drum at a speed that varies continuously between a maximum value and a minimum value, said drum driving means including:
a. a guide component rotatable about a fixed axis,
b. means to rotate said guide component,
c. means providing a diametral groove in said component,
d. a roller slidable in said groove,



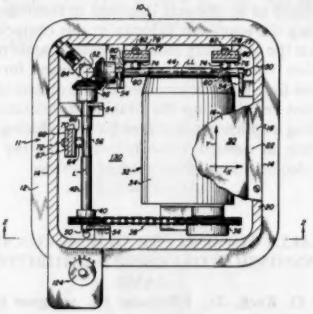
e. a revolving disc on which said roller is mounted close to the circumference of the disc, said roller being mounted for rotation about a fixed axis parallel to and displaced from the axis of rotation of the guide component, and
f. the axis of rotation of the disc being displaced with respect to the axis of rotation of the component to drive the drum at the aforesaid variable speed, and
E. means to render the grippers operative to grip a sheet when the drum is rotating at its minimum value and without stopping the drum.

4,075,897

APPARATUS FOR OBTAINING RELATIVE ORBITAL MOVEMENT IN ELECTRICAL DISCHARGE MACHINING

Fred Schmidt, Cranford, N.J., assignor to Triangle Tool Company, Union, N.J.

Continuation-in-part of Ser. No. 547,082, Feb. 4, 1975, abandoned. This application Dec. 8, 1975, Ser. No. 638,930
Claims priority, application Italy, Mar. 3, 1975, 20849/45
Int. Cl.[2] F16H *33/10*
U.S. Cl. 74—86 **29 Claims**



1. Apparatus for obtaining orbital movement of a driven member, said apparatus comprising:
a frame;
a first cam mounted for rotation on the frame, said first cam having a given cam surface and throw, the throw of said first cam extending in a first direction;
a second cam mounted for rotation of the frame, said second cam having a given cam surface and throw, the throw of said second cam extending in a second direction transverse to the first direction;

drive means for simultaneously rotating both cams in synchronism;

first coupling means coupling the driven member with the first cam for reciprocating movement along said first direction in response to rotation of the first cam, said first coupling means permitting simultaneous reciprocating movement of the driven member relative to the first cam along said second direction independent of said rotation of the first cam; and

second coupling means coupling the driven member with the second cam for reciprocating movement along the second direction in response to rotation of the second cam, said second coupling means permitting simultaneous reciprocating movement of the driven member relative to the second cam along the first direction independent of said rotation of the second cam;

the given cam surface and throw of each cam being such that movement of the driven member simultaneously along said first and second directions in response to the synchronized rotation of the cams results in orbital movement thereof.

4,075,898

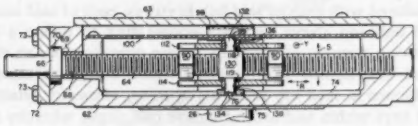
SCOTCH YOKE

William L. Carlson, Jr., St. Cloud, Minn., assignor to General Signal Corporation, Rochester, N.Y.

Continuation of Ser. No. 530,641, Dec. 9, 1974, which is a division of Ser. No. 385,379, Aug. 3, 1973, abandoned. This application Jun. 14, 1976, Ser. No. 695,890

Int. Cl.[2] F16H *21/40*

U.S. Cl. 74—89.15 **4 Claims**



1. A scotch yoke and an actuator therefor comprising:

(a) a scotch yoke housing having a hole therethrough, a threaded rod extending along an axis through said hole in a first direction, means for preventing said rod from moving in said first direction, a yoke arm in said housing pivotable about an axis and extending in a second direction that intersects said first direction, slot means in said yoke arm, a member on said rod and threadingly engaged therewith, said member having projection means extending through said slot means in said yoke arm, a means cooperating with said projection means for absorbing thrust in a sideward direction on said yoke arm and in a sideward direction on said rod, said means for absorbing thrust being positioned in a plane which includes said axis of said rod and is perpendicular to said sideward direction of said rod to thereby minimize bowing and twisting in said yoke arm and said rod, and a threaded hole extending through said member, said rod being threaded into said threaded hole, said means for absorbing sideward thrust to minimize bowing and twisting comprises a guide strap fixed to said housing and a saddle slidably mounted on said guide strap, said guide strap extending in said first direction, said projection means fitting into a hole in said saddle to link said saddle to said yoke arm, whereby rotation of said rod slides said member in said first direction and pivots said yoke arm about said axis, and

(b) actuator means for rotating said threaded rod to thereby rotate said yoke arm.

4,075,899

OPERATING MECHANISMS

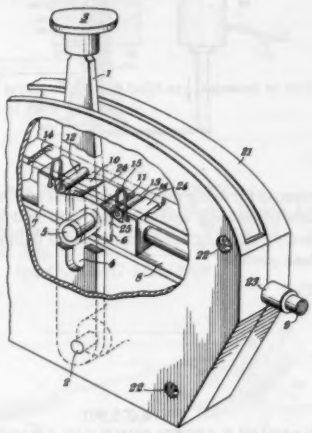
Jack Leonard Bartholomew, 5 Newick Drive, Newick, Sussex, and Derek John Bristow, Jackies Lane, Freshwater, Newick, Sussex, both of England

Filed May 20, 1976, Ser. No. 688,393

Claims priority, application United Kingdom, May 30, 1975, 23553/75

Int. Cl.[2] F16H *21/44*

U.S. Cl. 74—102 **14 Claims**



1. An operating mechanism comprising:

a housing;

a guide member in said housing;

an output member slidable in said guide member;

a surface on said guide member adjacent said output member at all slidable positions thereof;

said output member including at least one surface inclined so that it converges toward said surface of the guide member whereby a maximum and minimum separation distance exists therebetween;

at least one rolling means located between the inclined surface of the output member and said surface of the guide member;

the diameter of said rolling means being intermediate the maximum and minimum separation distances between said inclined surface and said surface of the guide member;

means for urging said rolling means along said inclined surface toward said minimum separation distance;

input means;

said input means being operative when actuated to displace said rolling means toward said maximum separation distance;

means operative to apply force to said output member upon actuation of said input means whereby displacement of said output member is urged; and

said means for urging being further operative to resume urging said rolling means into jamming abutment upon termination of actuation.

4,075,900

TWO-SPEED VIDEO RECORDER

Henry John Hattendorf, 262 Santa Paula, Grand Prairie, Tex. 75050

Filed Apr. 12, 1976, Ser. No. 676,111

Int. Cl.[2] F16H *9/06*; B65H *17/22*

U.S. Cl. 74—217 S **4 Claims**

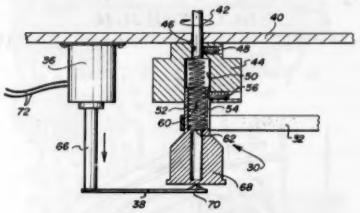
1. Speed changing apparatus for connection to a video recorder comprising:

a base portion operable to be rotated,

an aperture formed in said base portion,

a pulley having an extension slidably received within said aperture but keyed for rotation with said base portion, said pulley having a large diameter portion and a small diameter portion,

a spring positioned within said aperture for normally biasing said pulley to an extended position,



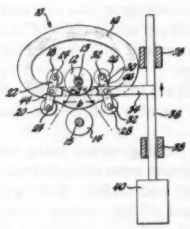
a solenoid for being mounted adjacent said base portion, and means connecting said solenoid with said pulley for selectively extending and retracting said pulley relative to said base portion.

4,075,901

VARIABLE SPEED FRICTION TRANSMISSION

William J. Freyermuth, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 3, 1977, Ser. No. 765,352
Int. Cl.[2] F16H *7/00, 15/00, 7/10*
U.S. Cl. 74—226 **4 Claims**



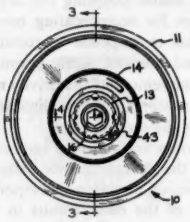
1. A transmission comprising a cylindrical drive pulley, a cylindrical driven pulley, an endless belt of a suitable material and a predetermined uniform thickness, said belt being frictionally confined between said drive and driven pulleys and loosely encompassing one of said pulleys, an inner pair of cylindrical positioning pulleys mounted toward the inside of said endless belt on opposite sides of said one of said pulleys, an outer pair of cylindrical positioning pulleys mounted toward the outside of said endless belt on opposite sides of the other of said drive and driven pulleys, each of said inner and outer pairs of positioning pulleys frictionally confining a portion of said endless belt, and means for moving said positioning pulleys inwardly or outwardly so as to cause said endless belt to bend partially around one of said drive and driven pulleys such that the inner and outer surfaces of said belt become respectively alternately variably shortened or lengthened to thereby cause said inner and outer surfaces to travel different distances and, hence, different speeds for infinitely varying the resultant speed ratio between said drive and driven pulleys between predetermined limits, depending upon the relative dimensions of said drive and driven pulleys radii and said belt thickness.

4,075,902

VARIABLE SPEED PULLEY

Loris J. Charchian, Troy; Larry E. Marvin, St. Clair Shores, both of Mich., and George R. Boxhorn, West Allis, Wis., assignors to Dana Corporation, Toledo, Ohio

Filed Sep. 27, 1976, Ser. No. 727,058
Int. Cl.[2] F16H *55/52*
U.S. Cl. 74—230.17 C **12 Claims**



1. A variable speed pulley for use with a rotatable shaft comprising, in combination, a tubular hub, means for attaching said hub to rotate about an axis with such shaft, said hub having at least two substantially V-shaped keyways spaced symmetrically about an outer surface and extending parallel to such axis, first and second sheave halves each having a tubular sleeve and an integral annular flange defining a conical surface, said conical surface on each sheave half defining one side of a V-belt receiving groove, said sheave half sleeves each having a central opening for slidably receiving said hub, means attaching said first sheave half sleeve to said hub whereby said first sheave half rotates with said hub, means attaching said second sheave half sleeve to said hub including a separate substantially V-shaped keyway in said second sheave half sleeve opening associated with each of said hub keyways, each of said associated hub and sleeve keyways cooperating to define a key receiving opening of generally square cross section, an elongated key formed from a non-metallic compliant material positioned in each key receiving opening, means for retaining said keys within said second sheave half sleeve whereby said second sheave half and said keys are free to slide axially on said hub, and springs mean biasing said second sheave half towards said first sheave half.

4,075,903

ADJUSTABLE STEERING COLUMN

Thomas G. Cornell, Danville, Ky., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 14, 1976, Ser. No. 723,257
Int. Cl.[2] B62D *1/18;* **G05G** *5/16, 5/18*
U.S. Cl. 74—493 **15 Claims**

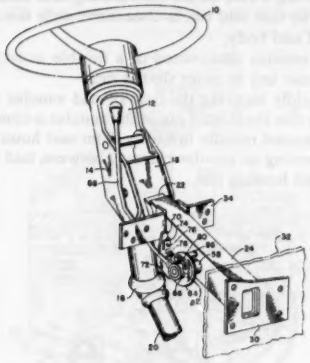
1. An adjustable steering column for a vehicle comprising:

an outer tubular member adapted to be secured to the body of said vehicle;

an inner tubular member received in said outer tubular member and axially movable therein in a telescoping relationship; and

means operable upon actuation by the vehicle operator for clamping said inner member to said outer member, said clamping means comprising a first retaining means received in the interior of said inner member, a second retaining means mounted on the exterior of said outer member, and fastening means received through said inner and outer members to operatively connect said first and second retaining means, wherein movement of said movable means from said first position to said second position

causes a clamping force to be applied to said inner and outer members, said clamping force being released by



movement of said movable means from said second position to said first position.

4,075,904

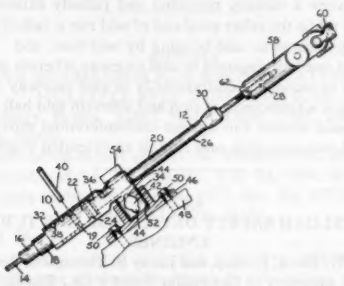
ADAPTER FOR PUSH-PULL CONTROL CABLES

Steve Irwin, Seattle, Wash., and Dick Moser, Stow, Ohio, assignors to Incom International Inc., Pittsburgh, Pa.

Filed Mar. 13, 1975, Ser. No. 558,053

Int. Cl.[2] F16C *1/10*

U.S. Cl. 74—501 P **26 Claims**



1. An adapter for attachment to a push-pull control cable, said control cable having a conduit slidably supporting a motion transmitting core, an end fitting attached to said conduit and coaxial therewith, said end fitting having an annular groove therein, said adapter comprising a substantially "L" shaped member, the longer leg of said member having a longitudinally extending bore therethrough for fitting over and accommodating said end fitting at least one hole through said leg perpendicular to said bore and in alignment with said annular groove, fastening means adapted to be inserted within said hole to engage said end fitting at its annular groove, to positionally fix in an axial direction said adapter on said end fitting.

4,075,905

STABILIZED FLEXIBLE REMOTE CONTROL WITH SPACED BALL BEARINGS

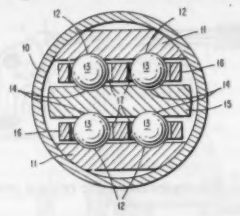
Peter R. W. Schaaphok, Mount Kisco, N.Y., assignor to Controlex Corporation of America, Croton Falls, N.Y.

Filed Nov. 29, 1976, Ser. No. 745,592

Int. Cl.[2] F16C *1/10*; B21H *1/14*

U.S. Cl. 74—501 R **7 Claims**

1. In a tubular flexible remote control for transmitting push and pull forces wherein at least one flexible push-pull blade is in contact with a series of spaced balls on each of its opposite sides, the improvement of said control wherein each said blade has two parallel grooves in at least one side of each said blade



and two parallel series of spaced balls are disposed in said two parallel grooves of each said blade.

4,075,906

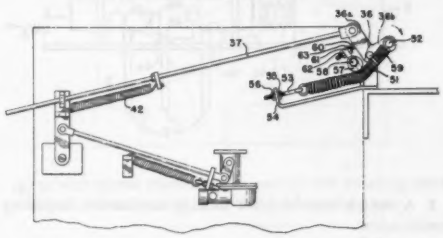
VARIABLE SPEED GOVERNOR

James E. Schimpf, Joliet, and Lucien B. Shuler, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 6, 1976, Ser. No. 712,429

Int. Cl.[2] G05G *1/14, 9/08*

U.S. Cl. 74—513 **5 Claims**



1. A control system including in combination an engine variable speed governor for sensing changes in engine speed from a preselected setting and controlling the speed of the engine to correspond to said setting;

operator control input means connected to said governor and movable over a control range for varying the control setting of said governor; and

balance means connected to said operator control input means for acting in opposition to reactive forces of said governor against said operator control input means for establishing a substantially constant force for said operator control input means over a major portion of said control range comprising spring means acting in opposition to said reactive forces and cam means engaging said spring means and altering the normal variations in tension of said spring over its normal range of displacement.

4,075,907

VARIABLE TRANSMISSION RATIO BRAKE ACTUATING DEVICE

Miloslav Petrzelka, Troisdorf, Altenrath, Germany, assignor to Uni-Cardan AG, Lohmar, Germany

Filed Nov. 18, 1976, Ser. No. 742,747

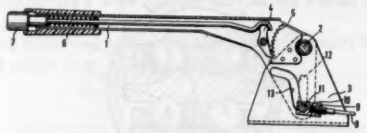
Claims priority, application Germany, Nov. 27, 1975, 2553228

Int. Cl.[2] G05G *1/04*

U.S. Cl. 74—523 **3 Claims**

1. A variable ratio brake actuating device comprising a frame, a brake lever pivotally mounted on said frame, first and second guide means on said frame and brake lever respectively extending toward the pivot mount and intersecting each other throughout pivoting of the brake lever, and a connector link to transmit force to a brake always positioned at the point of

intersection of said first and second guide means, pivoting of said brake lever guiding said link at a distance relative to the



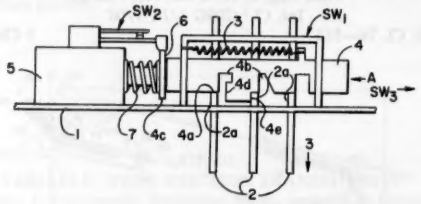
pivot mount which decreases from the release position toward the braking position.

4,075,908

CONTROL LEVER LOCKING MECHANISM

Shoji Suzuki, Iwaki, Japan, assignor to ALPS, Motorola, Inc., Japan

Filed Jan. 2, 1975, Ser. No. 538,095
Claims priority, application Japan, Feb. 16, 1974, 49-18949
Int. Cl.[2] G05G *5/06*
U.S. Cl. 74—527 **2 Claims**



1. A switch control lever locking mechanism including in combination:

a switch frame member;

a switch control lever, having a projecting portion thereon, slideably mounted in said frame member for movement between first and second positions;

a cam plate slideably mounted in said frame member for movement between first and second positions along a path at right angles to the path of movement of said switch control lever and having a first surface thereon for engaging the projecting portion of said control lever with said cam plate in said first position to prevent movement of said control lever from the first to the second position thereof, said cam member further having a slot therein aligned with the projection on said control lever with said cam plate in said second position to permit movement of said switch control lever between the first and second positions thereof; and

means for selectively moving said cam plate between the first and second positions thereof,

said means for moving said cam plate including a solenoid having an armature operatively coupled with said cam plate for controlling movement thereof between said first and second positions and including means for supplying a first amount of electrical power to said solenoid for moving said cam plate means from one of said first and second positions to the other and means for supplying a reduced amount of power to said solenoid to positively maintain said cam plate means in said other position.

4,075,909

AUTOMATIC SHAFT BALANCER

James E. Deakin, 52511 Belle Vernon, Rochester, Mich. 48063

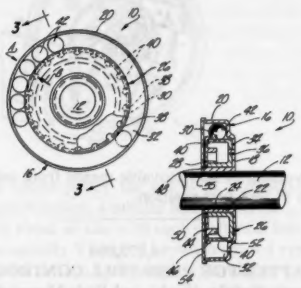
Filed Jan. 29, 1976, Ser. No. 653,494
Int. Cl.[2] F16F *15/32*
U.S. Cl. 74—573 R **6 Claims**

1. A device for automatically correcting an unbalanced condition in a rotating body and maintaining said body in a balanced condition comprising:

a housing having a rim, means for securing said housing to said body so that said rim is concentric with the axis of rotation of said body,

a one piece annulus constructed of a flexible material and having a base and an outer slotted rim,

means for rigidly securing the base of said annulus to said housing so that the slotted rim of the annulus is concentric with and spaced radially inwardly from said housing rim thereby forming an annular raceway between said slotted rim and said housing rim,



a floating inertia ring and means for securing said inertia ring across the open axial end of said slotted rim whereby said ring is adapted to flex the open axial end of said slotted rim between a radially retracted and radially extended position while the other axial end of said rim is radially stationarily secured to said housing by said base, and

at least one ball disposed in said raceway wherein said ball is free to move circumferentially in said raceway with said ring in a retracted position and wherein said ball is locked by said slotted rim against circumferential movement in said raceway with said ring in an extended position.

4,075,910

OVERLOAD SAFETY DEVICE FOR GAS TURBINE ENGINES

Warren W. Davis, Dunlap, and Leroy R. Thompson, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 20, 1976, Ser. No. 716,044
Int. Cl.[2] F16H *57/10;* **F16D** *7/02;* **B60T** *13/04*
U.S. Cl. 74—785 **16 Claims**

1. A drive mechanism mounted in a stationary housing comprising

an input shaft rotatably mounted in said housing,

an output shaft rotatably mounted in said housing,

drive means, including normally engaged drive establishing means, interconnecting said input shaft and said output shaft for normally permitting said input shaft to continuously rotate said output shaft under varying torque loads, and

an overload safety device including clamping bar means pivotally mounted in said mechanism adjacent to said drive establishing means for normally permitting engagement of said drive establishing means and for releasing said drive establishing means when said torque loads exceed a predetermined amount.

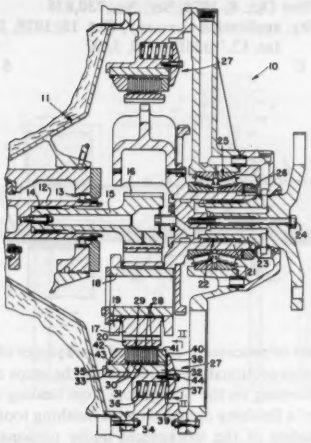
14. A drive mechanism comprising

an input shaft,

an output shaft,

drive means, including normally engaged drive establishing means comprising first and second sets of interleaved friction discs, interconnecting said input shaft and said output shaft for normally permitting said input shaft to drive said output shaft under varying torque loads, and

an overload safety device including clamping bar means pivotally mounted in said mechanism adjacent to said drive establishing means for normally permitting engagement of the first and second sets of friction discs of said



drive establishing means by applying pressure thereto and for releasing said first set of friction discs from said second set of friction discs when said torque loads exceed a predtermined amount.

4,075,911

DRIVE MECHANISM FOR RECIPROCATING AND MULTIPLE STEP INDEX DEVICES

John Henry Brems, 32867 White Oaks Trail, Birmingham, Mich. 48010

Continuation-in-part of Ser. No. 444,024, Feb. 20, 1974, abandoned, and Ser. No. 474,947, May 31, 1974, abandoned. This application May 15, 1975, Ser. No. 577,942

Int. Cl.[2] B23B *29/24*

U.S. Cl. 74—816 **16 Claims**

1. A reversible and cyclically repetitive indexing system incorporating a substantially linear, first harmonic and higher harmonic components to achieve a variety of kinematic objectives comprising:

(a) a frame,

(b) a main output member supported by said frame for movement along a predetermined path,

(c) a first rotating pair supported by said frame comprising:

(1) a first rotating member mounted for rotation in said frame,

(2) a first eccentric member mounted eccentrically, in non-rotational relation to, and on said first rotating member,

(d) a second rotating pair mounted in fixed spatial relationship with said first rotating pair comprising:

(1) a second rotating member,

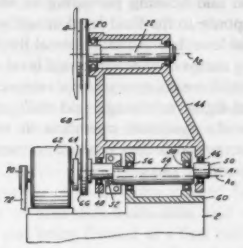
(2) a second eccentric member mounted eccentrically in non-rotational relation to, and on said second rotating member,

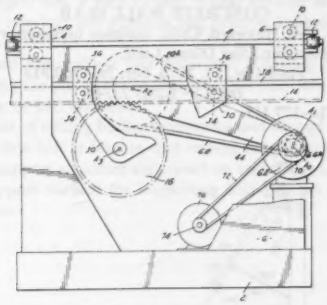
(e) means connecting for rotation said first rotating pair and said second rotating pair for substantially integral angular velocity ratio,

(f) means connecting said main output member with said first eccentric member and with said second eccentric member comprising:

(1) a first output member in tangential driving engagement with the periphery of one of said eccentric members,

(2) a second output member rotatably mounted to the other of said eccentric members, and





(g) power means connected to one of said rotating pairs to impact a rotary motion to that said rotating pair.

4,075,912

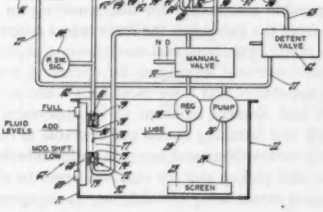
TRANSMISSION WITH SUMP OIL LEVEL RESPONSIVE CONTROLS

Robert H. Schaefer, Westfield, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 20, 1976, Ser. No. 752,460

Int. Cl.[2] B60K *41/04;* **F16K** *21/18*

U.S. Cl. 74—867 **9 Claims**



1. In a transmission: a housing having a sump with a normal fluid level range and an abnormal fluid level beyond said normal fluid level range; a multiratio gear unit having drive means for establishing low and high ratio drives mounted in said housing; a mainline; a fluid pressure source having a suction inlet in said sump and applying substantially proper regulated pressure when the fluid level in said sump is in said normal fluid level range and at said abnormal fluid level to said main-

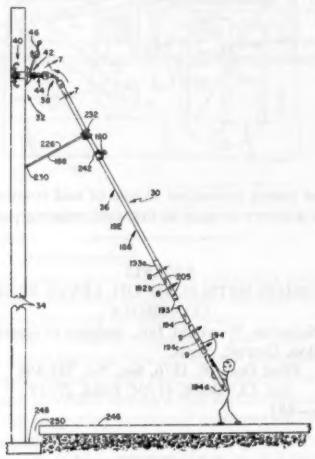
line for proper positive transmission operation; shift control means for selectively controlling said drive means to selectively establish said low and high ratio drives; level sensor means mounted in said housing providing an abnormal fluid level signal in response to the fluid level in said sump being at said abnormal fluid level beyond said normal fluid level range; and shift inhibiting means connected to said level sensor means and said shift control means operative in response to said abnormal fluid level signal to change said shift control means operation to provide abnormal operation in one operating phase and provide normal proper positive transmission operation in another operating phase.

4,075,913

REMOTELY OPERABLE MECHANISM FOR DISCONNECTING A PICKUP UNIT FROM A TILT-UP CONCRETE WALL SLAB

Dennis W. Tye, Hayward, Calif., assignor to Superior Concrete Accessories, Inc., San Diego, Calif.

Filed Dec. 15, 1976, Ser. No. 750,913
Int. Cl.² B25B *13/48*
U.S. Cl. 81—177 UJ **14 Claims**



1. The combination of lifting apparatus for a tilt-up concrete wall slab, said apparatus including an insert for embedment in the slab and a pickup unit to be removably connected to the slab by fastening means releasably engaging the insert, and a remotely operable mechanism for disconnecting an elevated pickup unit from the slab when the latter is in a raised position following a lifting operation, said mechanism comprising:

an elongated element serving as an operating handle and having uppermost and lowermost ends when in use,

means on said element adjacent to its uppermost end for engaging said fastening means and operable to release the fastening means from said insert in order thereby to disconnect said pickup unit for removal from the slab,

said engaging means being movable into its engagement with said fastening means and operable when the latter is disposed at a location above and remote from an operator of the mechanism by manipulation of said element grasped adjacent to its lowermost end, and

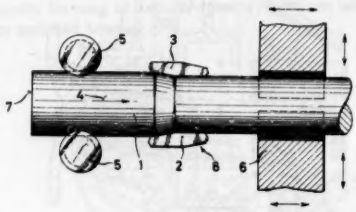
fulcrum means associated with said element and adapted to effect pivotal movement of the element whereby movement of the lowermost end of the element causes the element to function as a lever for pulling said fastening means away from the slab.

4,075,914

METHOD FOR ROTARY PEELING ELONGATED WORKPIECES

Wilhelm Schweer, Leichlingen, Germany, assignor to Th. Kieserling & Albrecht, Solingen, Germany

Filed Oct. 8, 1976, Ser. No. 730,836
Claims priority, application Germany, Oct. 15, 1975, 2546171
Int. Cl.² B23B *1/00, 5/00*
U.S. Cl. 82—1 C **5 Claims**



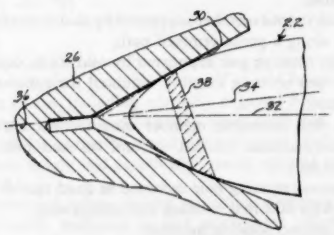
1. In a method of processing elongated workpieces of generally circular cross-sectional shape including the steps of; progressively performing on the workpieces from leading to trailing ends thereof a finishing operation with finishing tools while preventing rotation of the workpieces under torsional stress imparted thereto from the finishing operation by holding the workpieces in an unfinished area adjacent the finishing tools, releasing the hold on the unfinished area of the workpieces as the trailing ends thereof approach the finishing tools, and clamping the workpieces in a finished area adjacent the finishing tools at least prior to said step of releasing the hold on the unfinished area, the improvement comprising; smoothly reducing the torsional stress imparted to the workpieces by the finishing tools before said step of releasing the hold on the unfinished area of the workpieces and continuing to perform the finishing operation on the workpieces to the trailing ends thereof at the reduced torsional stress.

4,075,915

CENTERING APPARATUS

Lionel Williams, 14733 Winchester, Harvey, Ill. 60426

Filed Apr. 21, 1975, Ser. No. 570,190
Int. Cl.² B23B *23/02*
U.S. Cl. 82—33 R **2 Claims**

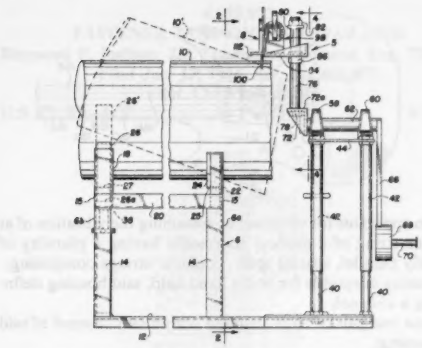


1. A centering mechanism for a rotary machine tool such as a lathe or the like, having a pair of opposed confronting stocks, a centering tool mounted in each of said stocks, at least one of said centering tools being symmetrically convex and substantially parabolically shaped to effect engagement with a recess in a work piece, said workpiece having a recess in each end thereof, in a substantially frusto-conical zone in such a way that the axis of the work piece is coincident with the axis of the stock even if the axis of the work piece recess bears an angular relation to the axis of the work piece.

4,075,916
PIPE CUT OFF SAW

Roy Jack Fisher, Dallas, Tex., assignor to Nipak, Inc., Dallas, Tex.

Filed May 21, 1976, Ser. No. 688,758
Int. Cl.[2] B23D 45/12
U.S. Cl. 82—78 8 Claims

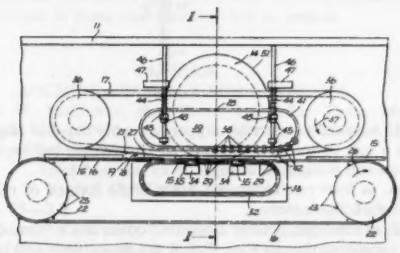


1. In a pipe cutting device: a base; spaced pipe supports mounted on the base; means to adjust the height of one of the supports to tilt a pipe carried in the supports; a saw; means for supporting the saw in a position to engage and cut a pipe disposed on the supports; means to move the saw in an arcuate plane about a pipe disposed on the support; and means to adjust the height of the saw support comprising means slidably mounting the support relative to the base; a threaded shaft having an upper end secured to the support; a sleeve attached to the base with the lower end of the shaft extending into the sleeve; and a collar threadedly engaged with the shaft resting on the upper end of the sleeve whereby when the collar is rotated the shaft is caused to move into and out of the sleeve to adjust the height of the support.

4,075,917
DEVICE FOR CUTTING A PILE OF SHEETS WITH A DISK-KNIFE

Hermann Kistner, Tamm, and Gunthart Lehmann, Heubach, Lautern, both of Germany, assignors to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

Filed Mar. 31, 1976, Ser. No. 672,389
Claims priority, application Germany, Apr. 4, 1975, 2514836
Int. Cl.[2] B26D 7/06
U.S. Cl. 83—422 18 Claims



1. In a device for conveying and cutting a pile of sheets, the combination of:

a frame;

at least one disk knife supported on said frame for rotation about its axis, said disk knife having two sides, one of said sides having a circumferential planar portion, said planar portion being surrounded by a circular cutting edge, at least said planar portion of said one side and said cutting edge defining a common plane extending at right angles to said axis of rotation;

a conveyor for feeding the pile of sheets to said disk knife in a conveying direction, said conveyor including first and second elongated, flexible, endless conveyor elements having clamping parts, deflecting means for supporting said conveyor elements on said frame for revolving movement along endless paths so that the clamping parts of said conveyor elements extend along each other and the circumferential surfaces of said clamping parts confront each other and define a clamping gap for the pile of sheets, said first conveyor element being located farther away from said axis of said disk knife than said second conveyor element and being formed as a first endless belt having a portion forming a counter knife and a first and a second surface said first surface confronting said clamping gap, said disk knife and said first endless belt being mutually so arranged that a part of said planar portion and cutting edge overlaps and contacts said counter knife of said first endless belt, so that said disk knife and said counter knife of said first endless belt constitute a cutting device for cutting the pile of sheets with a scissor-like cut in a cutting range of said conveyor;

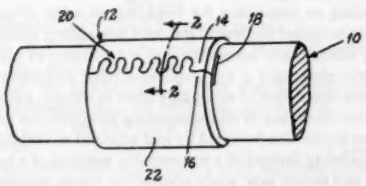
a first set of rolling bodies supporting said second surface of said first belt at least in said cutting range; and

a first support structure supported on said frame and having a support surface for supporting said first set of rolling bodies.

4,075,918
ROTARY ANVIL COVER

Louis E. Sauer, St. Louis, Mo., assignor to L. E. Sauer Machine Company, St. Louis, Mo.

Continuation of Ser. No. 515,520, Oct. 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 372,423, Jun. 21, 1973, abandoned. This application Apr. 1, 1976, Ser. No. 672,648
Int. Cl.[2] B26D 7/20
U.S. Cl. 83—659 25 Claims



1. In a cover for a rotary anvil, a main body of resilient material having ends with complimentary lug and recess interlocking means whereby the body may be joined to form a cover for the anvil and means adjacent the interlocking means for elevating the surface of the cover at the interlocking means, to counteract the tendency of the cover thereat to yield to compressive forces applied to the anvil to a greater degree than the yielding of the rest of the cover.

4,075,919

CUTTING BLADE OF A DEVICE FOR CUTTING A YARN IN A TEXTILE MACHINE

Ikuo Komura, Toyota; Hideo Tamai, Kariya, and Takayuki Morita, Obu, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Dec. 27, 1974, Ser. No. 536,751
Claims priority, application Japan, Dec. 27, 1973, 49-370
Int. Cl.[2] B26D *1/14*
U.S. Cl. 83—676 6 Claims

1. In a device for cutting a tail-end yarn portion, a cutting blade comprising:

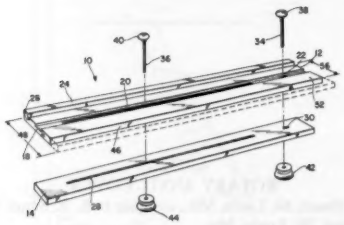
a main body formed from thin plate and having at least one sharp cutting edge formed on at least one peripheral portion of said main body, said sharp cutting edge being provided with at least one etched surface formed on one side thereof.

4,075,920

POWER SAW CUTTING GUIDE

Edwin S. Neal, 101 E. Boulevard, Charlotte, N.C. 28203

Continuation-in-part of Ser. No. 435,527, Feb. 8, 1974, Pat. No. 4,014,236. This application Aug. 16, 1976, Ser. No. 714,897
Int. Cl.[2] B27B *9/04, 27/06*
U.S. Cl. 83—745 10 Claims



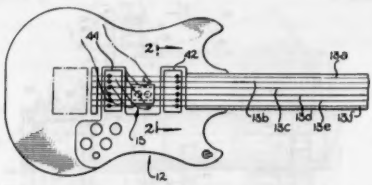
1. A sawing guide for guiding a power saw having a flat base plate during the sawing of an object comprising a guide plate assembly including an elongated guide plate for engaging the saw base plate to control the line of cut, the guide plate including a flat surface for engaging the flat base plate for said saw, an upstanding shoulder extending above said flat surface including an inner face for engaging an edge of said flat base plate to define the line of cut, said upstanding shoulder extending substantially across the major dimension of said elongated guide plate, and a cut indicating edge extending across the major dimension of said guide plate in spaced, parallel relation to the inner face of said upstanding shoulder, the guide plate at least in the area bounded by and adjacent to said cut indicating edge being formed of a non-metallic material of a type to be cut by said power saw, angle controlling means adapted to engage said object and to extend between said object and said guide plate, and mounting means to secure said guide plate to said object and to maintain said guide plate in contact with said object, said mounting means being adapted to allow pivotal movement of said guide plate relative to said object to maintain a first portion of said guide plate in contact with said object while permitting said angle controlling means to vary the distance between a second portion of said guide plate and said object.

4,075,921

STRING INSTRUMENT VIBRATION INITIATOR AND SUSTAINER

Gregory S. Heet, 611 Ducommun St., Los Angeles, Calif. 90012

Continuation of Ser. No. 595,597, July 14, 1975, abandoned. This application Dec. 2, 1976, Ser. No. 746,690
Int. Cl.[2] G10H *3/00*
U.S. Cl. 84—1.16 14 Claims



1. An apparatus for initiating or sustaining the vibration of at least one string of a musical instrument having a plurality of generally parallel, spaced apart, coplanar strings comprising:

a housing adaptable for being hand-held, said housing defining a channel;

at least one pair of coils disposed within said channel of said housing;

guide means comprising a pair of parallel guides defined by said housing and disposed on opposite edges of said channel such that when said pair of guides engage alternate strings said channel straddles at least one intermediate string; and,

amplifier means having an input coupled to one of said coils and an output coupled to the other of said coils;

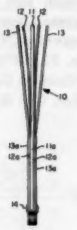
whereby said intermediate string may be set in motion by said amplifier means and coils and said motion is sustained by said amplifier means and coils.

4,075,922

DECORATIVE PERCUSSION RHYTHM INSTRUMENT AND NOISEMAKER

Thomas R. Smith, 27 Brushy Hill Road, Newtown, Conn. 06470

Filed Dec. 15, 1975, Ser. No. 640,957
Int. Cl.[2] G10D *13/08*
U.S. Cl. 84—402 7 Claims



1. A sound-producing clapper assembly capable of producing a soft pattering sound and an alternative, louder, rattling drum-roll noise comprising:

A. at least one elongated drum blade formed of relatively stiff, flat material;

B. at least one flexible elongated cover blade formed of flat material thinner than that of the drum blade and having a reduced thickness bendable transverse region at an intermediate point along its length;

C. and at least one flexible elongated clapper blade formed of flat material thinner than that of the cover blade; and sandwiched between the cover blade and the drum blade;

D. with all of the elongated blades being firmly joined together at one handle end by at least one through-fastener, permitting the clapper assembly to be held in one hand by

a user near the fastener and moved in a flapping motion, producing repeated successive impacts of the blades on each other,

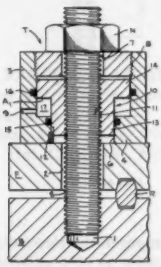
whereby gentle flapping motion patters the clapper blade softly against the drum blade, while vigorous flapping motion clatters the clapper blade briskly against both the drum blade and the cover blade in a continuous drum-roll rattle.

4,075,923

FASTENER TENSIONING APPARATUS

Raymond E. Latham, 231 Tamerlaine, Houston, Tex. 77024

Filed Jun. 17, 1976, Ser. No. 696,877
Int. Cl.² F16B *35/00*
U.S. Cl. 85—1 T **8 Claims**



1. Apparatus for placing tension on a standard bolt or stud fastener device having a threaded shaft and a standard cooperating nut member for holding the shaft in tension while fastening two or more objects together, said apparatus comprising:

housing means for surrounding said fastener shaft in a fixed relationship thereto and against which said cooperating fastener nut member may bear, said housing means having end openings therein through one of which said shaft may extend for engagement by said fastener nut member externally of said housing means;

piston means disposed within and sealingly engaging said housing means and axially movable therein between a first position and an axially spaced second position, said piston means being centrally bored and threaded from one end to the other for removable and axially adjustable attachment to said threaded shaft, leaving the end of said shaft exposed externally of said housing means for said engagement by said nut member;

annular chamber means defined by said housing and piston means; and

port means communicating with said chamber means through which pressure may be applied to said piston means for movement thereof between said first and second positions to place said fastener shaft in tension.

4,075,924

ANCHOR ASSEMBLY FOR FASTENER

Thomas W. McSherry, Bay Shore, and Allan Thaw, Massapequa, both of N.Y., assignors to Mechanical Plastics Corporation, Farmingdale, N.Y.

Filed May 14, 1976, Ser. No. 686,323
Int. Cl.² F16B *21/00, 13/06*
U.S. Cl. 85—3 R **30 Claims**

1. An anchor assembly for retaining an elongated fastener member within an opening defined by a wall portion having at least one concealed side which comprises:

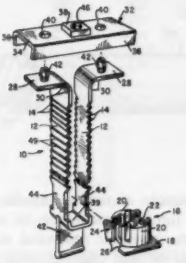
a. at least two elongated leg members of flexible material positioned in generally parallel relation;

b. means connecting a pair of adjacent end portions of said leg members;

c. a generally elongated anchor member positioned transversely of the leg members at the opposite end portions thereof and defining an opening generally medial of the leg members capable of receiving an elongated fastener member positioned between the leg members for attachment to the anchor member;

d. means to connect an end portion of each leg member to said anchor member, at least said end portion thereby connected being generally transversely oriented relative to said leg members and at least portions of said leg members adjacent said connected portions being resilient and angularly oriented relative to the major portion of the associated leg member to bias said anchor member toward its transverse position relative to said leg members against forces which tend to rotate said anchor member toward a generally parallel orientation with said leg members, and control of the orientation and position of said anchor member behind a concealed wall portion is facilitated by said leg members; and

e. a collar member of a resilient material configured to be at least partially received within the wall portion opening



and having at least one flange member extending outwardly therefrom in a direction generally transverse of its axis, and defining at least two openings for reception of said leg members and having means correspondingly positioned, configured, and dimensioned to engageably mate with said leg members to restrict movement of said collar member relative to said leg members when said leg members are positioned within said openings to facilitate selective positioning of said collar member along said leg members and to selectively permit gripping of wall portions of several thickness between said anchor member and said collar member while said flange member engages at least a surface portion of said wall portion adjacent the wall portion opening to prevent said collar member from entering the wall portion opening, said collar member defining at least one opening substantially aligned with said anchor member opening for reception of an elongated fastener member positioned between said leg members.

4,075,925

SPRING ACTION EXPANSION BOLT

Lester Lerich, Broomfield, Colo., assignor to Wej-It Expansion Products, Inc., Broomfield, Colo.

Division of Ser. No. 422,537, Jan. 2, 1974, Pat. No. 3,967,525.
This application Jun. 30, 1976, Ser. No. 701,414
Int. Cl.² F16B *13/08*
U.S. Cl. 85—64 **1 Claim**

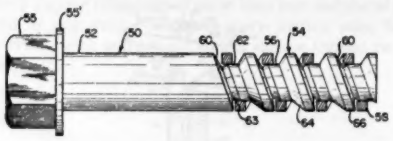
1. A masonry expansion bolt adapted to be anchored within a bolt hole comprising:

an elongated shank portion of generally circular cross-section having a diameter equal to or slightly less than that of the bolt hole,

a wedging section extending at least along a portion of said shank including a plurality of peripheral ridges in longitudinally spaced relation to each other, the space between adjacent of said ridges being in the form of an annular channel of generally trapezoidal cross-section with an inner surface parallel to and concentric with the longitudi-

nal axis of said bolt, a forward side inclined radially outward at an obtuse angle to said inner surface, and a rearward side also inclined radially outward at an obtuse angle to said inner surface, said channel also having an annular groove of generally V-shaped cross-section recessed into its inner surface at its rearward side, the rearward side of said V-shaped groove being an extension of the rearward side of said channel inclined radially inwardly in the same plane as said rearward side of said channel, and the forward side of said V-shaped groove diverging away from the rearward side at a right angle thereto, and

resilient wedging means in the form of an annular wire ring of substantially square cross-section normally disposed in said channel forwardly of said groove with one of its flat sides positioned adjacent and parallel to the inner surface of said channel, the crosssectional dimension of said wire between opposite of its flat sides being greater than the depth of said channel, said wire ring also being slidable longitudinally rearwardly in said channel in response to urging in that direction of force applied to its outer periph-



ery and rotatable about its annular longitudinal axis in response to limiting resistance to said rearward sliding movement on its inner rearward edge by said inclined rearward side of said channel such that said inner rearward edge is rotatable into and retained by said V-shaped groove in a position with its outer forward edge rotated to protrude radially outward beyond the peripheral surface of said bolt into engagement with the walls of said hole with said one flat side of said wire ring bearing against said forward side of said V-shaped groove to restrain said bolt from longitudinal retraction from said hole, the diagonal dimension of said substantially square cross-section being greater than the combined depths of said channel said v-shaped groove by an amount which is more than the difference between said dimension between the opposite flat sides and the depth of the channel, said wedging section being in the form of a threaded section in which said channel extends spirally therealong, and said wedging means is defined by a number of turns of a coiled spring wire extending along said channel.

4,075,926

GUN BARREL

Kjell Viktor Eriksson, and Ivan Åslund, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed May 12, 1976, Ser. No. 685,574
Claims priority, application Sweden, May 30, 1975, 7506177
Int. Cl.[2] F41F *17/08*
U.S. Cl. 89—16 **4 Claims**

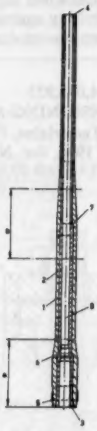
1. An improved gun barrel comprising:

an outer tube dimensioned to withstand internal gas pressure of the magnitude encountered during firing of a gun embodying said barrel for a small number of rounds without rupture;

an inner liner located within said outer tube and so dimensioned to withstand said gas pressure for a large number of rounds that a crack may extend completely through said inner liner to its boundary with said outer tube before the rejection limit for said barrel is reached; and

means cooperating with said outer tube and said inner liner for providing an indication of the presence of a crack extending through said inner liner to said boundary,

said indicating means comprising at least one conductor between said outer tube and said inner liner in position to be broken or deformed by movement of said inner liner or said outer tube or both of them under the influence of powder gas pressure coming through a crack in said inner



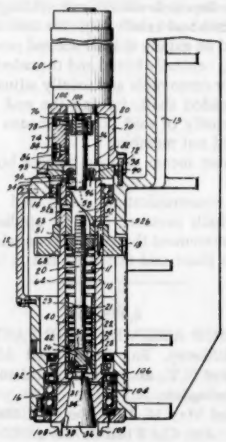
liner, whereby changes in the electrical characteristics of said conductor provide an indication of the presence of a crack through said inner liner.

4,075,927

TOOL ORIENTING AND RELEASE MECHANISM FOR MACHINE TOOL

James L. Frazier, Los Alamitos, Calif., assignor to Houdaille Industries, Inc., Fort Lauderdale, Fla.

Filed Nov. 6, 1975, Ser. No. 629,217
Int. Cl.[2] B23Q *17/18;* B23C *1/00*
U.S. Cl. 90—11 D **23 Claims**



1. In a machine tool having a tool-supporting spindle, the combination comprising a draw bar supported by said spindle and adapted for longitudinal movement relative thereto between a tool retaining position and a tool release position, a plurality of tool retention fingers connected with the lower end of said draw bar adapted to assume a tool gripping position when said draw bar is in its tool retaining position and a tool release position when said draw bar is in its tool release position, a cam secured to said spindle, a cam driver member

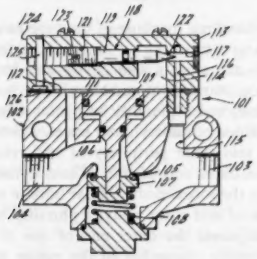
mounted on an actuating shaft adapted for longitudinal movement relative to said spindle, means for movng said actuating shaft so that said cam driver member is moved into engagement with said cam and then said actuating shaft is moved into engagement with said draw bar, whereby said cam and said spindle are rotated to a predetermined angular orientation, said draw bar being moved by said actuating shaft as said cam driver member moves beyond the point at which it engages said cam, whereby said draw bar is moved to its tool release position.

4,075,928

SAFETY VALVE FOR FLUID SYSTEMS

Paul A. Bitonti, Troy, Mich., assignor to Ross Operating Valve Company, Detroit, Mich.

Filed May 31, 1974, Ser. No. 474,901
Int. Cl.² F15B *13/04*
U.S. Cl. 91—29 **5 Claims**



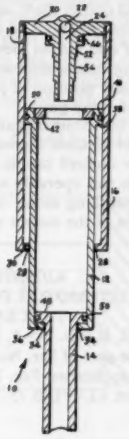
1. In combination with a reciprocable motor, a compressed air supply line for said reciprocable motor, said line having a supply valve for selectively pressurizing and exhausting said line and a control valve for said motor fed by said line through said supply valve, a safety valve interposed between said supply and control valves, said safety valve having a housing, supply and outlet ports in said housing, a radial valve seat in said housing, a valve stem carrying a poppet valve member engageable with said seat, said supply port being connected to said seat so as to urge said poppet valve member against the seat, a spring urging said member against the seat, a piston carried by said stem movable in a piston chamber in said housing leading to one face of said housing, a portion of said piston chamber being formed by a cover mounted on said housing face, means separating the other side of said piston from said supply and outlet ports, a first passage in said housing leading from said supply port to the portion of said piston chamber formed by said cover, an unrestricted second passage in said housing leading from said portion of the piston chamber to said outlet port, and means for adjustably restricting said first passage, said means comprising a member manually movable with respect to said passage and accessible by an operator from the outside of said housing in the vicinity of said housing face and cover, said adjustable restriction member further comprising a needle valve rotatably mounted in said cover passing through said piston chambers portion and disposed within a portion of said first passage, whereby rotation of said needle valve will adjust restriction, the relative dimensions of said piston and spring being such that said piston will shift said valve member against the urging of said spring to its open position when a predetermined proportion of said full line pressure has been reached.

4,075,929

THREE STAGE THRUSTING DEVICE

Paul F. Peterson, Rancho Palos Verdes, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,055
Int. Cl.² F01B *15/00*; F15B *11/18, 15/22*
U.S. Cl. 91—168 **4 Claims**



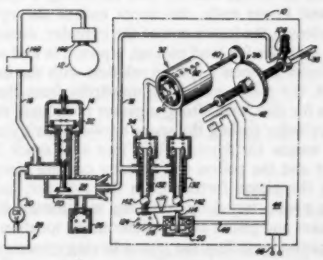
1. A three stage thrusting device comprising: a housing; first and second driving means telescopally mounted within the housing and adapted to extend from one end thereof, said first driving means positioned within said second driving means; means for sealing one end of the housing; probe means attached to the sealing means and extending into the first first driving means wherein said probe means is tapered and adapted to mate in a sealed relationship with a collar portion of said first driving means; port means in the end seal means and extending through the probe means for allowing fluid forces to act upon the said first and second means.

4,075,930

PNEUMATIC ACTUATOR SYSTEM AND METHOD

Dennis A. Millett, Tempe, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Apr. 28, 1976, Ser. No. 681,004
Int. Cl.² F16B *13/16, 13/044*; B64C *13/36*
U.S. Cl. 91—361 **12 Claims**



1. In combination:

a generally elongated housing having a pair of separate, internal, elongated chambers therewithin;

a linearly shiftable mechanical output member mounted for reciprocation within one of said chambers;

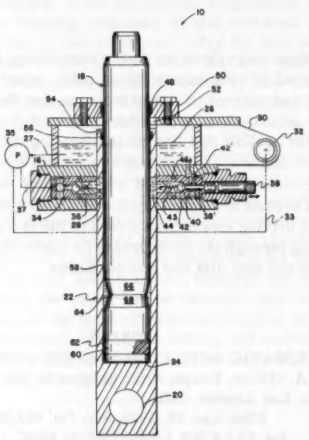
a rotary, bi-directional, pneumatic vane motor operably disposed in the other said chambers;
a power output shaft operably coupled to said motor and mounted for rotation within said housing, said output shaft extending substantially parallel to said linear member;
gearing means operably extending transversely across said housing between said output shaft and said output member for effecting linear shifting of said member in response to rotation of said output shaft, said output shaft being rotatable in opposite directions to effect corresponding opposite shifting of said output member;
elongated sensing means disposed in said one chamber for sensing the linear position of said output member;
a source of pressurized gas;
conduit means for communicating said source with said motor to effect rotation thereof; and
directional flow control means operably disposed in said conduit means and operably associated with said sensing means for controlling motor operation in relation to said sensed position of the output member.

4,075,931

LIFT-JACK FLUID MOTOR FOR HYDRAULIC LIFT TRUCKS

Melvin R. Caldwell, R.F.D. No. 1, Millersville, Pa. 17551

Continuation-in-part of Ser. No. 620,865, Oct. 9, 1975, abandoned. This application Feb. 24, 1977, Ser. No. 771,771
Int. Cl.² F15B *15/22, 13/042*
U.S. Cl. 91—402 **3 Claims**



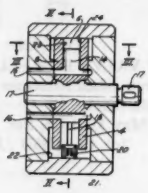
1. In an expanding chamber fluid motor for load lifting in hydraulic lift trucks and the like, including: a cylinder having upper and lower ends, the upper end of the cylinder open, means closing the lower end of the cylinder, means for attaching the cylinder for load pickup, a piston in and supported by the cylinder in openly spaced relation with the interior of the cylinder, the piston extending upwardly from the cylinder in position for said load lifting, a gasket proximate the upper end of the cylinder sealing the space between the cylinder and the piston, means for forcing fluid into said space between the cylinder and the piston and thereby causing piston travel extending the piston further from the cylinder; and means for limiting piston travel by releasing said forced fluid between said gasket and piston at a predetermined location in the travel of the piston including the piston having structure defining an annular recess around the periphery of the piston with a portion of the annular recess tapering inward downwardly, the improvement comprising, the annular recess proportioned for and located along the piston in position for releasing said forced fluid in a 360° arc above said gasket and over the periphery of the upper end of the cylinder, the length of the annular recess in an axial direction relative to the piston and cylinder being greater than that of said gasket, and a portion of the piston remaining below the gasket and supported by the cylinder at said position for releasing the forced fluid.

4,075,932

ROTOR, PISTONS, PISTON SHOES AND ASSOCIATED MEANS IN FLUID HANDLING DEVICES

Karl Eickmann, 2420 Isshiki,, Hayama, Kanagawa, Japan

Continuation of Ser. No. 321,854, Jan. 8, 1973, Pat. No. 3,967,540. This application Mar. 11, 1976, Ser. No. 666,003
Claims priority, application Austria, Jan. 7, 1972, 2138/72
Int. Cl.² F01B *13/06*
U.S. Cl. 91—488 **7 Claims**



1. In a fluid-handling machine of the type having a housing formed with a cavity having an inner circumference, a rotor body rotatably mounted in said cavity and having an outer periphery and a plurality of radial cylinder bores extending inwardly thereof, and a plurality of pistons each slidably accommodated in one of said cylinder bores, a plurality of recesses formed in said outer periphery of said rotor body, each intersecting the outer end of one of said cylinder bores and extending from the associated cylinder bore in one circumferential direction of said rotor body; a plurality of piston shoes each located adjacent the outer end of one of said cylinder bores and pivotably connected to the piston accommodated therein, said piston shoes each having an outwardly directed face in sliding engagement with said inner circumference and an extension projecting transversely of and beyond the associated cylinder bore in said one circumferential direction of said rotor body, said cylinder bores, recesses and piston shoes being configurated so that in the fully retracted position of the respective piston shoe the same is located substantially entirely within the associated recess and outer end of the associated cylinder bore without projecting beyond the outer periphery of said rotor body, the improvement comprising that said recesses extend in said rotor body only in direction forwardly of the axis of a respective piston, whereas the backward clyinder wall portion extends uninterrupted radially toward the outer radial end of said rotor body for guiding the respective portions of the respective pistons at the outer portion of the piston stroke.

4,075,933

HYDRAULIC PUMP OR MOTOR

William T. Stephens, New Brighton, Minn., assignor to Gresen Manufacturing Company, Minneapolis, Minn.

Filed Jun. 4, 1976, Ser. No. 693,017
Int. Cl.² F01B *13/04*
U.S. Cl. 91—506 **15 Claims**

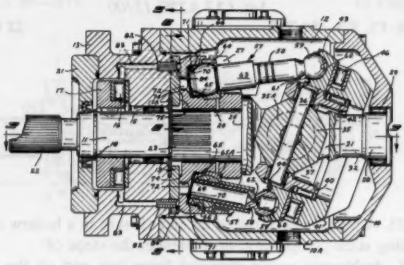
1. A hydraulic pump or motor, comprising:
(a) a housing defining a fluid inlet and a fluid outlet;
(b) a shaft rotatably carried by the housing;
(c) reciprocating piston-cylinder pumping means;
(d) actuating means associated with the rotatable shaft for reciprocating the pumping means as the shaft rotates;
(e) valving means for alternately connecting the pumping means with the inlet and outlet as it reciprocates;
(f) and carrying means defining a socket for pivotally carry-

ing a part of the pumping means relative to the valving means;

(g) the pumping means comprising

(i) a cylinder member defining a cylindrical bore of constant diameter and open at both ends, the exterior surface of the cylinder member defining a partial spherical surface disposed in and carried by said socket;

(ii) and a piston member reciprocally disposed in the cylinder, the piston member being operatively connected to the actuating means.

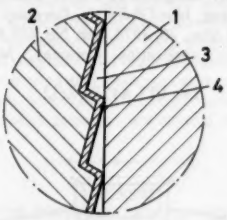


4,075,934

PISTON FOR INTERNAL COMBUSTION ENGINES

Erich Wacker, Heilbronn; Heinz Hofmann, Obereisesheim; Karl Kopp, Untereisesheim; Hermann Bauer, Neckarsulm; Volker von Ey, Neckarsulm, and Franz Weiss, Neckarsulm, all of Germany, assignors to Karl Schmidt GmbH, Neckarsulm, Germany

Filed Dec. 29, 1975, Ser. No. 645,129
Int. Cl.² F16J *1/02, 1/08*
U.S. Cl. 92—159 **5 Claims**



1. In combination: a piston having a piston skirt and an aluminum cylinder having a nonreinforced working surface for use in an internal combustion engine, said piston skirt having a profile in the form of vertically running saw teeth to define oil-dragging grooves on the periphery of said piston skirt, the saw tooth profile including a first side and a second side joined to one another to define a protruding tooth, said piston skirt having thereon an electrodeposited hard iron layer defining a saw tooth profile, said iron layer having a thickness of 1–30 μm and containing 0.5–6% by weight of a metal-oxy compound incorporated therein.

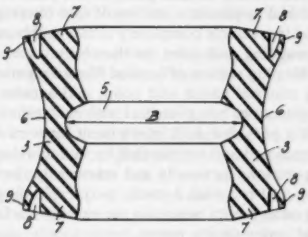
4,075,935

PISTON FOR PRESSURE FLUID OPERATED CYLINDERS

Pier Luigi Panigati, Via Friuli, 64, Milan, Italy (20135)

Continuation-in-part of Ser. No. 345,032, Mar. 26, 1973, abandoned. This application May 19, 1975, Ser. No. 578,565
Claims priority, application Italy, Mar. 30, 1972, 22626/72
Int. Cl.² F16J *1/02, 1/12*
U.S. Cl. 92—243 **2 Claims**

1. A piston for pressure fluid cylinders which comprises, a piston rod, a disc member fixed thereon and a sleeve-like body of elastic material open at both ends thereof and mounted on said disc member to overhang from both sides thereof and defining the piston head, said sleeve-like body having a central zone with an inner and outer peripheral surface, a circumferential notch on the inner periphery of said central zone for receiving the peripheral portion of said disc member, said inner peripheral surface of said central zone and said circumferential notch having, in disassembled condition thereof, a diameter effectively smaller than the diameter of said disc member, said sleeve-like body having at each end portion thereof a circumferential bead-like formation and a frontal end surface extending transverse to said piston rod, a circumferential longitudinally extending slot in said frontal surface, a flexible peripheral lip in said bead formation, the thickness and length of said flexible peripheral lip being defined by said slot, the difference



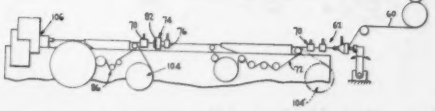
between the size of the diameter of said circumferential notch in disassembled condition and the size of the diameter of said disc causing upon the mounting of said sleeve-like body on said disc member a pretensioning and a deformation of said sleeve member such that said flexible lip has in mounted condition of said piston head an external peripheral end portion having a circumferential outer diameter smaller than the circumferential outer diameter of the corresponding bead formation and wherein said outer peripheral surface is outwardly concave and defines together with said bead formations a saddle-like configuration of the outer peripheral surface of said piston head, thereby allowing an offset positioning of said sleeve-like body with respect to said cylinder without detachment thereof from the cylinder inner wall at the side opposite to the side towards which the offsetting occurs.

4,075,936

METHOD AND APPARATUS FOR MAKING TOBACCO SMOKE FILTER

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Division of Ser. No. 627,858, Oct. 31, 1975, Pat. No. 4,022,221. This application Dec. 6, 1976, Ser. No. 747,603
Int. Cl.² A24C *5/50*
U.S. Cl. 93—1 C **15 Claims**



1. A method of making smoke filter means comprising the steps of:

a. providing a bondable filtering material including a multiplicity of fibrous members;

b. continuously passing said filtering material into and through an elongated bonding zone and, intermediate the passage of said filtering material through said bonding zone, contacting same with a bond activating agent to bond said fibrous members of said filtering material to

each other at spaced contact points thereby forming an elongated, smoke-permeable, rod defining a tortuous path for passage of smoke therethrough;

c. during the passage of said filtering material through said bonding zone, positioning a mandrel generally axially of said bonding zone to define an annular space through which said filtering material must pass;

d. reciprocating said mandrel in timed relationship to the passage of said filtering material through said bonding zone between a first position, at least as far forward in the path of travel of said filtering material as the point at which said filtering material is contacted by said bond activating agent, to thereby produce a smoke-permeable annular wall of bonded fibrous members as said filtering material passes said point, and a second position, sufficiently rearwardly of said point in the path of travel of said material to permit a portion of said filtering material to extend tranversely completely across said bonding zone before reaching said point, to thereby produce a smoke-permeable plug section of bonded fibrous members as said filtering material passes said point, said annular wall and said plug sections being integral with each other, whereby said rod is provided with intermittent inner cavity means totally enclosed and surrounded by said annular wall and by plug sections forwardly and rearwardly thereof;

e. covering said rod with a smoke-permeable plug wrap;

f. forming outer cavity means on the exterior surface of said rod, said outer cavity means being axially spaced from each other at least a position on either side of a transverse axis intermediate each inner cavity means, the area of said outer cavity means forming a minor portion of the total exterior surface of said rod;

g. overwrapping said rod with an overwrapping material so as to juxtapose portions of the inner surface of said overwrapping material with peripheral portions of the exterior surface of said rod to form sealed areas precluding passage of smoke thereacross; and

h. transversely severing said overwrapped rod at selected locations to form filter elements.

4,075,937

METHOD AND APPARATUS FOR FEEDING ROD-LIKE ARTICLES

Rolf Penzias, London, England, assignor to Molins Limited, England

Filed Mar. 18, 1976, Ser. No. 668,303

Claims priority, application United Kingdom, Mar. 25, 1975, 12351/75

Int. Cl.² A24C *5/50*

U.S. Cl. 93—77 FT **14 Claims**

1. A method of feeding rod-like articles in succession, comprising the steps of conveying groups of endwise-moving rod-like articles along part of a first path at substantially constant speed by means of a feed member which follows said path at said constant speed, delivering said groups onto a second path which diverges from the first path, and continuing to convey said groups with said feed member along an initial part of said second path so that the groups are conveyed by the feed member traveling along said first path at a progressively reducing component of said constant speed in the direction of said second path as the first and second paths diverge.

4,075,938

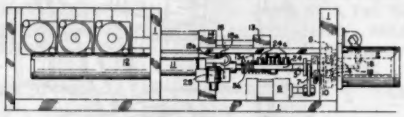
METHOD AND APPARATUS FOR MAKING END CLOSURES FOR SHIRRED CASING STICKS

Thomas W. Martinek, Covington, Ind., assignor to Teepak, Inc., Chicago, Ill.

Filed May 27, 1976, Ser. No. 690,745

Int. Cl.² A22C *13/00*

U.S. Cl. 9.3—84 TW **22 Claims**



21. A method of forming an end closure in a hollow shirred casing stick comprising, in sequence, the steps of:

1. deshirring casing material from one end of the casing stick;
2. winding the deshirred material into a wall portion generally transverse to the bore of said casing stick; and
3. advancing said wall portion into the bore of said casing stick while winding a generally cylindrically twisted portion following said wall portion, said cylindrically twisted portion being composed of casing material deshirred from said one end of said casing stick and wound on a rotating, axially translating mandrel.

4,075,939

LIQUID FEEDING DEVICE FOR COOKING CONTAINERS

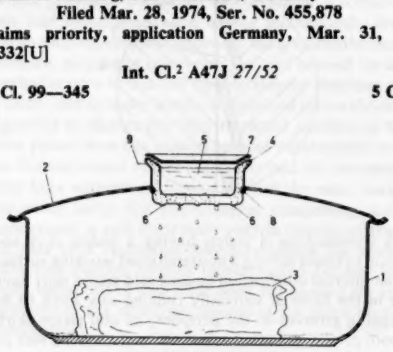
Walter Horn, Idar-Oberstein, and Rudolf Fissler, Kirschweiler, both of Germany, assignors to Fissler Gesellschaft mit beschrankter Haftung, Idar-Oberstein, Germany

Filed Mar. 28, 1974, Ser. No. 455,878

Claims priority, application Germany, Mar. 31, 1973, 7312332[U]

Int. Cl.² A47J *27/52*

U.S. Cl. 99—345 **5 Claims**

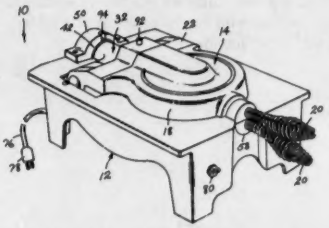


1. A liquid feeding device for a cooking container having an upper wall, said feeding device comprising a liquid reservoir, means supporting said reservoir on the upper wall of the cooking container with at least a portion of said reservoir being disposed within the cooking container so that liquid placed within said reservoir can be transferred to interior of the cooking container for replacing liquids evaporated during cooking, said reservoir portion includes porous, liquid permeable means for permitting the liquid within said reservoir to be gradually fed to the interior of the cooking container, said porous means being a ceramic material, said reservoir having side and bottom walls completely formed of porous, liquid permeable ceramic material, and a liquid impervious coating disposed on the side walls of said reservoir, whereby water is only permitted to be fed through said bottom wall.

4,075,940
BAKER FOR WAFFLES, PANCAKES AND SIMILAR FOOD ITEMS

Fred S. Carbon, 105 Days Ave., Buchanan, Mich. 49107

Filed Feb. 1, 1977, Ser. No. 764,766
Int. Cl.[2] A47J 37/00
U.S. Cl. 99—377 11 Claims

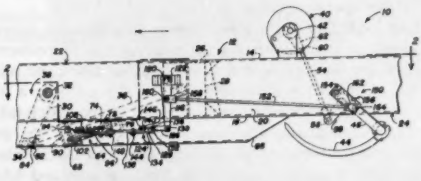


9. A baker for waffles, pancakes and similar food items, said baker including first and second shell members each having a hinge part and a concave food receiving part, said shell members having their respective hinge parts in a cooperating relationship and being pivotal about a first axis between a closed position in which said food receiving parts confront one another to form an enclosed baking cavity and an open position in which the shell members are separated at the food receiving parts thereof, a base, said base including means for supporting said shell members for rotation as a unit about a second axis when in their closed position, at least one of said shell members including handle means for rotating said shell members in their closed position about said second axis, the improvement wherein each shell member hinge part includes a pintle and a spaced eye, the hinge part pintel of each shell member fitting rotatively into the hinge part eye of the other shell member to accommodate movement of the shell members between their open and closed positions, and bracket means engaging said hinge parts for supporting said shell members and accommodating pivotal movement of the shell members between said open and closed positions, said bracket means including a shaft part, said base carrying said shaft part at its said shell member supporting means, said shaft part being rotatable with the shell members as the shell members are rotated about said second axis of rotation.

4,075,941
LINKAGE FOR CONTROLLING A NEEDLE SAFETY LATCH ON A BALER

Robert G. Young, Bird-in-Hand, and Richard A. Pucher, Leola, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 30, 1976, Ser. No. 718,644
Int. Cl.[2] B65B 13/08
U.S. Cl. 100—19 R 4 Claims



1. In a baler having a bale case, a plunger reciprocable in said bale case on working and return strokes, one or more needles for carrying banding material across said bale case, first pivot means on said bale case, a needle-carrying member being coupled through said first pivot means for movement from a home position towards said bale case and then away from said bale case back to said home position so as to correspondingly project said needles from a location outside said bale case to across said bale case and then withdraw said needles from said bale case back to said outside location, means reciprocating said plunger in timed relation with the movement of said needle-carrying member such that said needles are first projected and then withdrawn from across said bale case between predetermined successive working strokes of said plunger, a safety latch mechanism supported on said baler, means biasing said latch mechanism for movement from a retracted position to an extended position for stopping the reciprocation of said plunger if the timing between said plunger and said needle-carrying member is disrupted and said plunger moves on a working stroke when said needles are projected across said bale case, second pivot means on said bale case, a lever arm coupled to said second pivot means for a pivotable movement about the same and being pivotally interconnected to said latch mechanism, an improved linkage for controlling said latch mechanism, comprising:

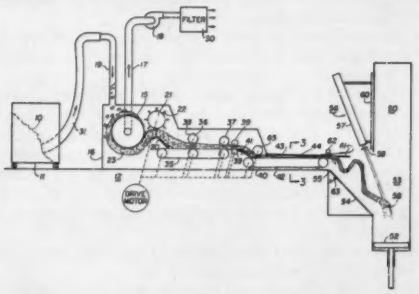
an elongated rigid member extending along said bale case and being pivotally interconnected at one end to said lever arm; and

a link pivotally coupled adjacent one of its ends to said first pivot means for said needle-carrying member, said link being pivotally coupled adjacent an opposite one of its ends to an opposite end of said elongated member, said link including a portion disposed in the path of movement of said needle-carrying member such that said needle-carrying member holds said link at a first position when said needle-carrying member is at its home position which via said elongated member and said lever arm holds said latch mechanism at said retracted position, said needle-carrying member releasing said link from said first position upon movement of said needle-carrying member away from its home position toward said bale case to allow said link to pivot to a second position as said biasing means moves said latch mechanism to its extended position upon said release of said link.

4,075,942
METHOD AND APPARATUS FOR FEEDING A BALE PRESS

Joe Johnson, Jr., Powder Springs, Ga., assignor to Coats & Clark, Inc., Stamford, Conn.

Filed Dec. 13, 1976, Ser. No. 749,815
Int. Cl.[2] B30B 7/04
U.S. Cl. 100—42 17 Claims



15. A process for baling fibrous materials while minimizing the discharge of dust into the atmosphere, comprising sucking said fibrous materials into a condenser while filtering the air output of the condenser, to produce a fluffy blanket of said fibrous materials, mechanically continually precompressing said fluffy blanket by passing it sequentially through packing roll means of decreasing density, directing said precompressed blanket continually to a bale press, having a loading door periodically ramming said blanket into said bale press in response to the presence of said blanket at the loading door of

said bale press, and then closing the door of said bale press and forming a bale of said material therein.

4,075,943

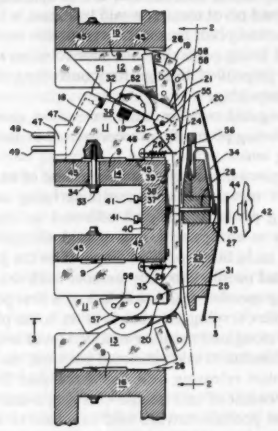
HIGH SPEED ACTUATOR FOR IMPACT LINE PRINTERS

Ross W. Johnston, Norristown, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Continuation of Ser. No. 449,866, March 11, 1974, abandoned. This application Oct. 21, 1975, Ser. No. 624,501

Int. Cl.[2] B41J *9/02*

U.S. Cl. 101—93.48 **3 Claims**



1. A high speed impact printing mechanism having high energy actuators for driving print hammers which are positioned opposite moving type from a ready position to a free flight position comprising:

a channel mounting means having vertical and horizontal mounting webs,

each said actuator having an actuator frame made of high flux density magnetic material mounted on a horizontal web of said channel mounting means,

each said actuator frame comprising a pivot mounting arm extension and a pole piece extension integral with said actuator frame and a flux path portion therebetween,

a magnetic coil winding wound on said pole piece extension of said actuator frame,

a low mass actuating lever comprising a moment arm and a force arm pivotally mounted on said pivot mounting arm extension of said actuator frame,

said moment arm being juxtaposed said pole piece extension and separated therefrom by an angular gap when said actuator and print hammer are in said ready position,

said force arm being angularly disposed from said horizontal web of said channel mounting means by approximately 90° and positioned opposite said vertical web of said channel mounting means in engagement with one of said print hammers,

said actuating lever being made of high flux density high strength magnetic material,

a plate of high flux density magnetic material attached to the end of said moment arm juxtaposed said pole piece extension and said flux path portion providing therewith a high flux density path through said actuating lever moment arm, said plate, said pole piece extension, said actuator frame and said flux path portion.

first adjustment screw means extending through an aperture larger than said first adjustment screw means in said horizontal web of said channel mounting means and engaged in said actuator frame for locking said frame on said channel mounting means in a predetermined horizontal position when said moment arm is closed flat against the face of said pole piece extension and said flux path portion with no angular gap to define said free flight position and with a predetermined angular gap to initially set said ready position of said actuator and said print hammer, and

second adjustment screw means in said vertical web cooperating with said force arm for making a final critical adjustment of the time of impact of said print hammer with said moving type by adjusting the size of said angular gap and finally setting said ready position of said actuating lever and said print hammer.

4,075,944

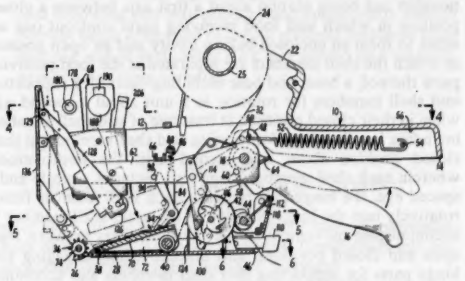
SELF-INDEXING LABEL MARKING GUN

Dwain D. Conley, Reno, Nev., assignor to Primark Corporation, Palo Alto, Calif.

Filed Apr. 30, 1976, Ser. No. 682,024

Int. Cl.[2] B41J *1/20;* B41F *1/08*

U.S. Cl. 101—94 **3 Claims**



1. An improved adhesive label printer of the type which operates in combination with pre-cut adhesive labels carried on a separable backing tape with regularly spaced apart perforations, the printer having trigger operated tape transport means for transporting the backing tape and labels through the printer and for sequentially separating the labels from the backing tape, the tape transport means having non-trigger operated portions which exert a retarding frictional force against the movement of the backing tape through the printer, and a printing head with a plurality of selectable characters for imprinting the labels, wherein the improvement comprises

a drive drum, the drive drum being rotatably mounted in the printer to contact the backing tape, and having a plurality of circumferentially spaced apart, radial projections for mating with the spaced apart perforations in the backing tape, the drive drum being selectively rotatable by the trigger operated means,

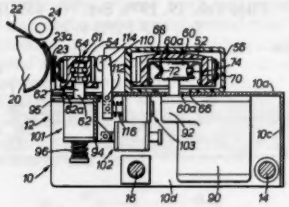
spring loaded pressure roller means mechanically interengaged to rotate with the drive drum and to resiliently press the backing tape against the drive drum, the roller means and drive drum together initially exerting a frictional pulling force on the label backing tape which is less than the retarding frictional force exerted by the tape transport means on the backing tape and labels which must be overcome to pull the backing tape and labels through the printer, whereby self-indexing is accomplished when the initial rotation of the drive drum and pressure roller means causes the backing tape to slip over the drive drum projections until the projections of the drive drum mate with the spaced apart perforations in the backing tape upon initial operation of the trigger operated tape transport means.

4,075,945

PRINT MEDIUM AND ASSEMBLY

Siegfried Heinz Bienholz, 43 Blamey St., East Bentleigh, Victoria, Australia

Filed Nov. 10, 1975, Ser. No. 630,647
Claims priority, application Australia, Nov. 12, 1974, 9585/74
Int. Cl.[2] B41J *1/20*
U.S. Cl. 101—111 11 Claims



1. A printing apparatus employing a printing assembly comprising:

a pair of spaced upright shafts, a structure supporting said shafts, one shaft being fixed relative to the structure while the other is laterally displaceable relative to said one shaft in a direction substantially perpendicular to the axes of the shafts;

a wheel supported on said other shaft and being freely rotatable on said other shaft;

means for effecting lateral displacement of said other shaft in a direction away from said one shaft to a predetermined position relative to said one shaft;

a second wheel mounted on said one shaft for rotation therewith; and

a continuous flexible band looped under tension around said wheels and carrying a multiplicity of indicia discretely arranged on the band whereby a discrete representation of the respective indicia can be transposed to a further medium, said band being resiliently extensible to increase the separation of the indicia;

an upright striker arm for engaging said wheel when the latter is in said predetermined position to thereby displace said wheel a further small distance away from said one shaft;

means for biasing the striker arm away from said wheel; and

means for momentarily effecting said wheel displacing movement of the striker arm.

4,075,946

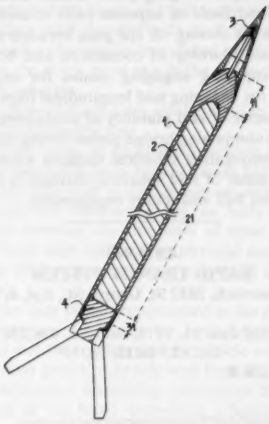
ARMOR PIERCING PROJECTILE

Jean Deffayet, and Etienne Lamarque, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jan. 27, 1977, Ser. No. 763,205
Claims priority, application France, Jan. 30, 1976, 76 02590
Int. Cl.[2] F42B *11/14*
U.S. Cl. 102—52 8 Claims

1. An armor-piercing projectile comprising an outer steel envelope having three portions: a conically tapering forward portion which defines a solid impact head having a leading edge contour suitable for piercing armor on impact as well as providing means for attaching an overlying nose cone thereto, a substantially cylindrical medial portion contiguous with said forward portion having a hollow area running its entire extent, said hollow area being filled with a ballast having a density greater than the density of said steel envelope,

and a cylindrical trailing portion contiguous with said medial portion, but remote from said forward portion provided with means to retain said ballast in said medial portion, and further provided with means for attaching stabilizing fins thereto.

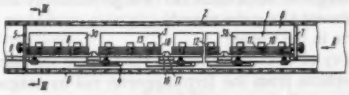


4,075,947

AIR TIGHT CONNECTION BETWEEN PNEUMATICALLY CONVEYED CONTAINERS

Evgeny Maximovich Soschenko, Polotskaya ulitsa, 16/14, korpus 4, kv. 46; Ivan Timofeevich Zonenko, Saperny proezd, 8, korpus 3, kv. 72; Adolf Moritsovich Alexandrov, Federativny prospekt, 6, korpus 3, kv. 8; Vladimir Efimovich Aglitsky, Zatsepsky val, 6/13, kv. 61; Jury Abramovich Tsimbler, Sojuzny prospekt, 10, kv. 261; Ilya Solomonovich Kantor, Malo-Moskovskaya ulitsa, 31, kv. 45; Jury Arnoldovich Topolyansky, Matveevskaya ulitsa, 10, korpus 4, kv. 233; Anatoly Petrovich Chizhikov, ulitsa Petrovka, 26, kv. 3, and Igor Igorievich Volyansky, ulitsa Stratonavtov, 12, korpus 1, kv. 12, all of Moscow, U.S.S.R.

Filed Mar. 19, 1976, Ser. No. 668,446
Claims priority, application U.S.S.R., Mar. 20, 1975, 2112002
Int. Cl.[2] B61B *13/10*
U.S. Cl. 104—23 FS 2 Claims



1. A train of containers for pneumatic transportation of goods through a tube having guideways secured to the internal surface thereof in opposition to one another, throughout the length of the tube, comprising:

a plurality of containers, means for connecting said containers to one another comprising a plurality of ball and socket joints wherein said ball is connected to a container and said socket is connected to an adjacent container wherein said ball and socket are engaged for connecting adjacent containers together, a front flap mounted on the end face of the foremost one of said plurality of containers, in the direction of the travel of said train, said front flap spanning the lower half of a gap defined between said train and said tube; a tail flap mounted on the end face of the tailmost one of said plurality of containers, in the direction of the travel of said train, said tail flap spanning the upper half of the gap defined between the train and said tube; longitudinal flaps mounted on the lateral side of each container of said plurality of containers, said longitudinal flaps acting

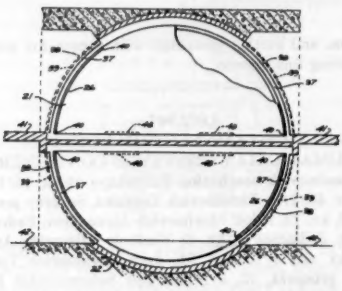
as the plain bearings of said train of containers in the process of its travel, said longitudinal flaps bearing upon said guideways; bridging piece means mounted on the opposing end faces of adjacent pairs of said plurality of containers for closing off the gaps between said adjacent pairs of said plurality of containers; said bridging piece means comprising engaging means for engaging each other and for engaging said longitudinal flaps of its associated container of said plurality of containers, said engaging means comprising bridge pieces having their end faces forming conjugating spherical surfaces wherein the geometrical center of said spherical surfaces is the center of the adjacent ball and socket engagement.

4,075,948

RAPID TRANSIT SYSTEM

Michael A. Minovitch, 2832 St. George St., Apt. 6, Los Angeles, Calif. 90027

Filed Jan. 31, 1974, Ser. No. 438,230
Int. Cl.[2] B61B *13/10*
U.S. Cl. 104—138 R **25 Claims**



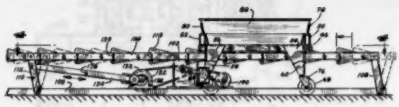
1. A rapid transit system comprising:
a plurality of stations;
tunnels extending underground between adjacent stations of said system, each of said tunnels between said stations comprising two sloping reaches separated by one horizontal reach;
means for evacuating and maintaining vacuum in said tunnels;
a ferromagnetic suspension rail of high resistivity extending lengthwise along the tunnel;
a vehicle in the tunnel;
a plurality of electromagnets on the vehicle for suspending the vehicle from the ferromagnetic rail by magnetic attraction so that no part of the vehicle is in physical contact with any part of the tunnel when it is coasting between stations;
said vehicle being propelled essentially by gravity when moving from one station to another station at equal elevations where acceleration propulsion is obtained by moving down one sloping reach of the vacuum tunnel, thereby converting gravitational potential energy into kinetic energy, and where deceleration is obtained by moving up another sloping reach of the tunnel, thereby converting kinetic energy back into gravitational potential energy to be used later for making the next trip;
magnetic means for roll stabilizing the vehicle about its longitudinal axis;
means for starting and stopping said vehicle in the immediate vicinity of each station; and
at least one air lock at each station for connection between the interior of the vehicle and the station to allow passage between such a station and the interior of the vehicle when stopped at the station without removing the vacuum environment from the tunnel surrounding the vehicle at the station.

4,075,949

CART PUSHING APPARATUS

Noel Davis, Wayzata; John T. Haub, Maple Grove, and Stanley C. Rustad, Golden Valley, all of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Feb. 19, 1976, Ser. No. 659,310
Int. Cl.[2] F27B *9/22*
U.S. Cl. 104—162 **8 Claims**



1. Apparatus for moving a plurality of aligned carts along a predetermined path comprising a frame construction which includes a pair of parallel elongated frame members, each cart including a frame structure adapted to straddle said frame construction, a pair of parallel elongated pusher bars, means for orienting said bars with respect to said frame members so that they are superposed and aligned therewith, said means including two pairs of substantially vertically oriented legs, means for pivotally connecting one end of each pair of legs to a frame member, means for pivotally connecting the other end of each leg to a pusher bar so that each pusher bar is connected to a frame member by a pair of said legs, means for oscillating said pusher bars with respect to said frame members along a path parallel to said bars and frame members, means mounted on said pusher bars for engaging a portion of at least one cart and causing it to move as the pusher bars move in a first direction, said engaging means comprising a plurality of lugs, means for mounting said lugs on the pusher bars so that they are axially aligned along the longitudinal axis of said bars in spaced-apart relationship, means for biasing said lugs in an upward direction so that a portion of each lug projects above the top surface of the pusher bar, said lugs being movable against such biasing action by exerting a downward force against said lugs, means on each cart frame adapted to be engaged by said lugs, said means including a pair of elongated parallel channel members, means for attaching said channel members to the cart frame so that they are aligned directly over said pusher bars and parallel therewith, a plurality of pusher plates, means for mounting said plates within the channel members in spaced-apart relationship so that they extend laterally with respect to the longitudinal axis of the channel members, said lugs adapted to engage said pusher plates as the pusher bars are caused to move in said first direction, said frame members and said pusher bars being shorter in length than the alignment of carts so that the means mounted on the pusher bars engage less than all the aligned carts, said cart when moved causing the other aligned carts ahead of it to move as well, said engaging means permitting said cart to remain substantially stationary as the pusher bars move in a second direction, and means for guiding said carts along said predetermined path.

4,075,950

RAILWAY LOCOMOTIVE TRUCK WITH RESILIENT SUSPENSION

Henry A. Marta, LaGrange Park; Kenneth D. Mels, Orland Park; Vijay K. Garg, Darien, and Albert J. Miller, LaGrange Park, all of Ill., assignors to General Motors Corporation, Detroit, Mich.

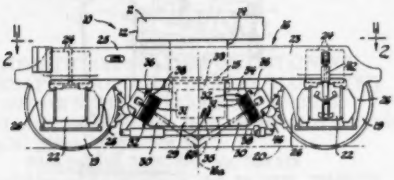
Filed Apr. 29, 1976, Ser. No. 681,712
Int. Cl.[2] B61C *9/50*; B61F *3/04, 5/08, 5/30*
U.S. Cl. 105—197 A **3 Claims**

1. A railway vehicle power truck having longitudinal and lateral central axes and comprising

a pair of wheeled axles spaced apart longitudinally equidistant from said lateral axis,

a rigid frame including (1) a pair of side frames extending longitudinally along opposite sides of the truck interconnecting and resiliently supported on said axles, (2) means laterally interconnecting said side frames, and (3) a bolster support depending from each of said side frames and centered between said axles, said bolster supports each having a pair of longitudinally spaced support points on their respective sides of said truck and equally spaced from said longitudinal and lateral central axes,

a bolster extending laterally across said truck along said lateral central axis at about the height of said axles with a center bearing carried on the top of said bolster at a height substantially below the top of said side frames, said bolster having longitudinal arms extending laterally adjacent to said bolster supports with load points opposing the bolster support points of said frame,



resilient suspension members disposed near axle height between said frame-carried bolster support points and said bolster carried load points and supporting said bolster on said frame, said suspension members on each side of said truck having primary load carrying axes angled downwardly and longitudinally inwardly to meet at points near rail height and in a vertical plane through the lateral central axis of the truck, said suspension members having high load carrying capacity and spring rates along their primary load axes and substantially lower capacities and spring rates in planes perpendicular thereto,

said suspension members comprising the sole means to carry under normal operating conditions all combinations of vertical, longitudinal and lateral loads between said truck frame and bolster with a minimum of weight transfer between axles during the application of traction and braking forces, the low center bearing location limiting longitudinal bolster tipping forces.

4,075,951

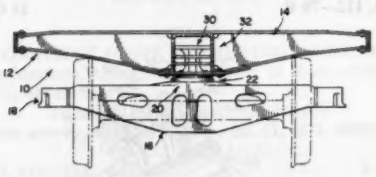
SELF LUBRICATING CENTER BEARING LINER

Osvaldo F. Chierici, Elmhurst, and Richard F. Murphy, Aurora, both of Ill., assignors to Holland Company, Lombard, Ill.

Continuation-in-part of Ser. No. 649,275, Jan. 15, 1976, abandoned. This application Dec. 29, 1976, Ser. No. 755,197

Int. Cl.[2] B61F *5/16, 5/50;* **F16C** *17/04;* **F11C** *33/66*

U.S. Cl. 105—199 C **8 Claims**



1. In a center plate arrangement for railroad cars having a car body riding on car trucks, with the center plate arrangement being centered on the car longitudinal center line and including at each truck a body bolster having a center plate, including a neck at its junction to the body bolster, and a truck bolster having a bowl swivelly receiving and supporting the body bolster center plate for swivelling movement about the truck pivot axis, and a liner received in the bowl and between the bowl and the body bolster center plate, said bowl defining an upstanding side wall thereabout defining at its upper edge the top surfacing of the bowl, and said body center plate defining a depending wall external side wall thereabout proportioned to fit within the bowl side wall and provide shiftable lost motion about the truck pivot axis in the plane of the bowl, the improvement wherein:

the liner is formed from a dry self lubricating polymer material that is distension free,

with the liner being of bowl configuration and defining a floor on which the body bolster center plate rests, and an upstanding side wall in circumambient relation about the bowl floor and received about the body bolster center plate and between the side wall of same and the truck bolster bowl side wall and in physical engagement with both the center plate and bowl side walls about the truck pivot axis,

and with the liner being proportioned in the portion of same that is interposed between the body bolster center plate side wall and the truck bolster bowl side wall to space the body bolster center plate side wall from the bowl side wall with a movement restraining connection therebetween in the plane of the bowl thereabout whereby longitudinal impacts acting on the car body are transmitted through the center plate side wall arrangement over a substantial portion of said side wall on either side of the car longitudinal center line,

with the liner side wall being free of tension acting longitudinally of said axis, and defining at its upper end rim surfacing that is spaced from and free of engagement with the bolster bowl top surfacing,

said liner and bowl defining a first normally operative slip surfacing whereby the bowl swivels relative to the liner and the body bolster center plate, on swivelling of the car truck relative to the car body,

said liner and the body bolster center plate defining a second contingency slip surfacing, whereby when said first slip surfacing is rendered temporarily restrained by said liner being clamped between said center plate and bowl side walls, the bowl and liner will swivel relative to the body bolster center plate at said second slip surfacing, on swivelling of the car truck, under such conditions, relative to the car body,

said liner being characterized by having the polymer material surface portions of same that engage the bowl and body bolster center plate to form said slip surfacing effecting during use of the assembly resurfacing of the portions of said center plate and bowl engaged thereby for reforming said center plate and bowl portions to have a wear free mirror finish.

4,075,952

SCISSOR-TYPE SLIDE GATE OPENER

Ralph Clarence Burge, Christiana, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 1, 1976, Ser. No. 701,613

Int. Cl.[2] B61D *7/26*

U.S. Cl. 105—282 R **1 Claim**

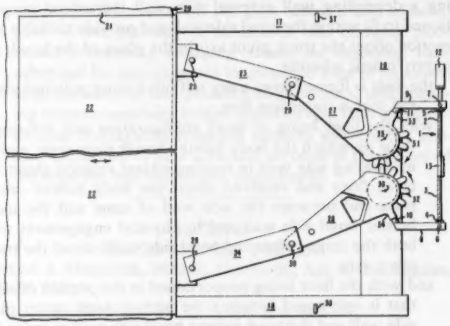
1. A discharge outlet assembly for a hopper car in which a slideable gate is moved between an open and closed position by a pair of crank arms which move links to operate the slide gate, said crank arms being connected to meshing gear sectors containing a socket which gears cause conjoint rotation of the crank arms for moving said slide gate between an open and closed position, the improvement comprising a motion transducer adapted to drive each of the paired gears of the meshing gear sector said motion transducer comprising

a rotatable, cylindrical shaft wherein said shaft has a right-hand threaded section on one outboard length and a left-hand threaded section on the opposite outboard length,

a pair of threaded members engaged on opposite sides of the threaded shaft so that rotation of the shaft moves said

threaded members in opposite directions on said threaded shaft,

a link pivotally mounted on each threaded member, and



a block adapted to fit into the socket of said gear sectors, said block being at the end of said link distal to said threaded member.

4,075,953

LOW POLLUTION INCINERATION OF SOLID WASTE

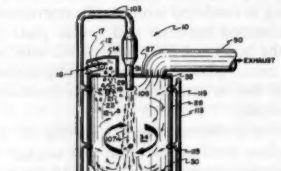
Norman K. Sowards, Coeur d'Alene, Id., assignor to Energy Products of Idaho, Coeur d'Alene, Id.

Continuation-in-part of Ser. No. 591,556, Jun. 30, 1975, Pat. No. 4,060,041. This application Jun. 20, 1977, Ser. No. 807,866

The portion of the term of this patent subsequent to Nov. 29, 1994, has been disclaimed.

Int. Cl.[2] F23G *5/00*; F23D *19/00*

U.S. Cl. 110—8 F **4 Claims**



1. An incineration system comprising:

a generally cylindrical incineration chamber;

a fluidized bed located within the chamber with a vapor space defined in the chamber above the fluidized bed;

means causing combustible waste to be introduced into the incineration chamber and dispersed within the fluidized bed;

effluent opening means above the vapor space communicating exhaust from the interior of the chamber;

influent air means communicating air into the interior of the chamber and being disposed centrally above the fluidized bed directing said air centrally downward against the fluidized bed and causing air to elevate within the chamber as an annulus adjacent the wall of the chamber;

auxiliary influent air means communicating air into the interior of the chamber adjacent the wall of the chamber within the vapor space with at least the major component of air displaced therefrom being tangential to the wall when introduced into the chamber;

whereby a gradually elevating annular vortex of air is created whereby fine particles are centrifuged from the vapor space to the fluidized bed and vapor space residence time for any residual particles is increased accommodating complete combustion.

4,075,954

DEVICE FOR MAKING BRAID OPENINGS IN CUTS OF GARMENTS

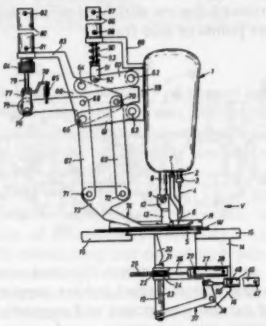
Peter Hintzen, Krickenbach, and Erich Willenbacher, Karlsruhe, both of Germany, assignors to Pfaff Industriemaschinen GmbH, Germany

Filed Dec. 7, 1976, Ser. No. 748,227

Claims priority, application Germany, Dec. 11, 1975, 2555753

Int. Cl.[2] D05B *3/10*

U.S. Cl. 112—68 **7 Claims**



1. In a two-needle sewing machine including a machine casing having a sewing head mounting the needles, a work support plate, a ripping knife supported in the sewing head and working between the needles to form an elongated slot of a braid opening in a cut garment piece, and means for making diverging corner cuts at the opposite ends of the elongated slot, an improved device for forming the braid opening comprising, in combination, a supporting bar guided in the machine casing for longitudinal displacement perpendicular to the work support plate and rotatable into different angular positions; a single angular cross-section cutting knife mounted on said supporting bar and serving as a tool for making said diverging corner cuts; and means operable to effect longitudinal and rotational displacement of said supporting bar and said cutting knife.

4,075,955

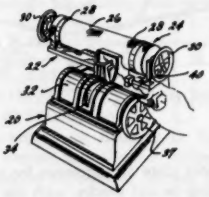
MACHINE FOR NEEDLEPOINT OR THE LIKE

Sidney Bass, Los Angeles, and Raymond Marie St. Pierre, Hawthorne, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 10, 1977, Ser. No. 757,870

Int. Cl.[2] D05C *15/04*

U.S. Cl. 112—79 R **18 Claims**



1. In a machine for performing needlepoint or the like, the combination comprising:

a housing;

a generally open framework mounted on said housing for movement in a first direction, said framework being adapted to support a fabric thereon;

a first member pivotally mounted to said housing and having a needle arm means on said needle are for receiving cord-like material, said needle arm being configured to insert said cord-like material through said fabric;

a second member pivotally mounted to said housing and having an arm portion configured to selectively slidably engage a surface of said needle portion, the end of said arm portion being configured for inserting through said fabric to releasably engage said cord-like material;

phased cam means operatively coupled to said first and second members for permitting insertion of said needle arm through said fabric, retention of the cord-like material by said arm portion during withdrawal of said needle arm and incrementing of said framework by said arm portion; and

means for moving said cam means.

4,075,956

AUTOMATIC APPARATUS FOR OBTAINING RING-SHAPED ARTICLES FROM AN ELONGATED PLAIT OR STRIP OF TEXTILE MATERIAL

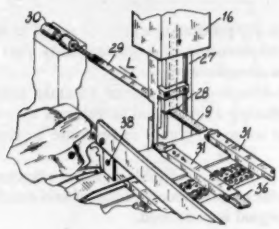
Orlando Manetti, Valdobbiadene, Italy, assignor to Sigismondo Piva S.p.A., Milan, Italy

Filed Jul. 14, 1976, Ser. No. 705,118

Claims priority, application Italy, Jul. 18, 1975, 25539/75

Int. Cl.[2] D05B *33/02*

U.S. Cl. 112—121.27 **8 Claims**



1. An automatic apparatus for obtaining ring-shaped articles from an elongated plait or strip of textile material, which comprises: a continuously feeding station for the plait or strip; a cutting station for cutting said plait or strip into sections of prefixed length; a folding station for the sections from said cutting station; a sewing station including means for receiving said folded sections and also including means for sewing together the cut ends of said folded sections to form ring-shaped articles; a transport station for carrying the folded sections to said sewing station wherein the ring-shaped articles are formed; a discharging device for receiving and discharging the finished ring-shaped articles from said transport station.

4,075,957

WORKPIECE GUIDE FOR SEWING MACHINES

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

Filed Jul. 15, 1976, Ser. No. 705,601

Claims priority, application Italy, Jul. 21, 1975, 25585/75

Int. Cl.[2] D05B *35/10*

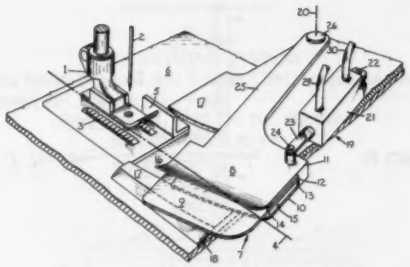
U.S. Cl. 112—153 **5 Claims**

1. A workpiece guide for a sewing machine having a work surface comprising:

(a) superposed upper, lower and base plates formed integrally with said guide which are spaced apart and disposed substantially parallel to the work surface and at right angles to the sewing axis;

(b) at least one integrally formed vertical wall disposed between said upper, lower and base plates and between the lower plate and the work surface, said vertical walls being disposed to the right of the sewing axis and being substantially convergent with said axis;

(c) a stationary bed plate including means defining a recess with arcuately shaped limits for receiving said base plate; and



(d) means for rotating the entire guide with respect to said bed plate about a vertical axis passing through a point situated on the right of the sewing axis and to a location displaced from the sewing elements.

4,075,958

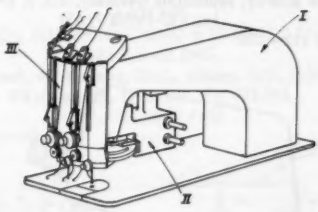
SEWING MACHINE AUTOMATIC THREAD CHANGER

Alfred D. Sacchetti, 1903 Sharon Road, Meadowbrook, Pa. 19046

Continuation-in-part of Ser. No. 639,569, Dec. 10, 1975, Pat. No. 4,036,157. This application Jul. 29, 1976, Ser. No. 709,697

Int. Cl.[2] D05B *1/08*

U.S. Cl. 112—163 **9 Claims**



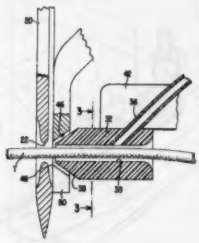
1. An automatic thread changer for use in connection with a sewing machine having a needle bar assembly, said automatic thread changer comprising a plurality of threaded needles and means to move said threaded needles one by one sequentially into operative but detachable connection with said needle bar assembly to form a temporary solid needle bar assembly, said automatic thread changer further including a plurality of needle holders to which said threaded needles are secured, one threaded needle being secured to one particular needle holder, said needle holders being detachably secured, one by one to a slidable connector, said needle holders having a through opening and said connector having a through opening whereby when there is a solid needle bar assembly, one of said needle holder through openings is aligned with said connector opening and a releasable shot pin extending through said openings to form said solid needle bar assembly.

4,075,959

PNEUMATIC THREAD AND FIBER FEEDING DEVICES

Josef Zocher, Aachen, Haaren, Germany, assignor to The Singer Company, New York, N.Y.

Filed Apr. 6, 1977, Ser. No. 785,266
Int. Cl.[2] D05B 87/00
U.S. Cl. 112—225 4 Claims



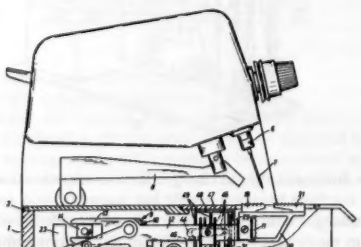
1. A device for feeding thread through the eye of a thread carrying needle comprising, a thread guide member formed with a delivery extremity shaped substantially complemental to the eye portion of a thread carrying needle, said thread carrying member being formed lengthwise with a thread accommodating passageway, a constricted slot formed the entire length of said thread accommodating passageway and extending radially from said passageway to the exterior of said thread carrying member, a compressed air delivery conduit opening onto said thread accommodating passageway and extending obliquely toward the delivery extremity thereof, and an operator influenced valve means in said compressed air delivery conduit for controlling the compressed air which propels a thread lengthwise through said thread accommodating passageway when the delivery extremity is positioned complemental to the needle eye for threading the needle.

4,075,960

LUBRICATING OIL SEALING DEVICE FOR A SEWING MACHINE

Kurt Klundt, Hirschhorn, Germany, assignor to Pfaff Industriemaschinen GmbH, Germany

Filed Jun. 24, 1977, Ser. No. 809,777
Claims priority, application Germany, Jul. 2, 1976, 2629713
Int. Cl.[2] D05B 71/00
U.S. Cl. 112—256 6 Claims



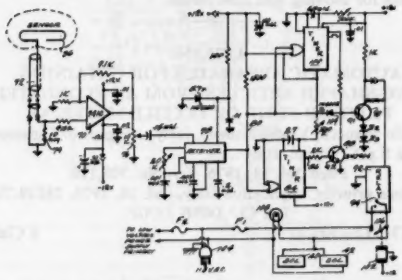
1. A sewing machine, comprising a housing having a wall with an opening therethrough, first and second material feed supports adapted to move backwardly and forwardly and upwardly and downwardly through the opening in said wall, said supports being movable relatively to each other and defining an oil duct therebetween having an oil inlet and an opposite oil outlet, first seal means engaged over the feed supports, means for mounting said first seal means adjacent the opening on the exterior of the wall so as to permit movement of said support means and to prevent the outward passage of the oil through the opening, and second seal means including first and second sealing members engageable over respective opposite exterior sides of said first and second feed supports on the interior of said housing adjacent the opening in said wall, and a frame in said opening having portions cooperable with said first and second sealing members to deflect oil from said members into the inlet.

4,075,961

INJURY PROTECTION DEVICE FOR MACHINERY

William Donald Harris, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed May 7, 1976, Ser. No. 684,319
Int. Cl.[2] D05B 69/36
U.S. Cl. 112—277 16 Claims



1. A system for producing a control signal to stop operation in response to intrusion of a human body part into a given machine area comprising:

means for detecting presence of a human part in said area and producing a first signal in response to intrusion of said part and a second signal in response to removal of said part,

means for producing a disable signal in response to said first signal which prevents operation of said machine until said second signal is produced,

means for producing an enable signal in response to said second signal for a predetermined time following production of said second signal to permit operation of said machine during said predetermined time and preventing operation thereafter, and

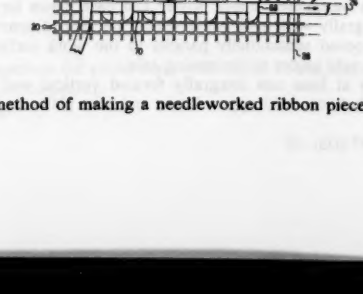
means connected to said disable signal producing means for causing said machine to stop in response to said disable signal and connected to said enable signal producing means for causing said machine to stop in response to the absence of said enable signal.

4,075,962

NEEDLEWORK TECHNIQUE USING RIBBON

Patricia D. Mabry, 2700 Mountain Brook Parkway, Birmingham, Ala. 35223

Filed Mar. 2, 1977, Ser. No. 773,498
Int. Cl.[2] D05C 17/00
U.S. Cl. 112—439 18 Claims



1. A method of making a needleworked ribbon piece on a

needlework canvas having a front, a back and a multiplicity of equally spaced interconnected strands lying along perpendicular *x* and *y* axes and defining a multiplicity of mesh openings, comprising

first steps for laying up a multiplicity of first flat untwisted ribbon sections on the front of said canvas extending in the direction of the *x* axis;

second steps for laying up a multiplicity of second flat untwisted ribbon sections on the front of the canvas extending in the direction of the *y* axis for completely covering the canvas front between margins of the piece;

the steps including

juxtaposing, inside the margins, four sides of each first section to a side of a different second section,

juxtaposing, inside the margins, four sides of each second ribbon section to a side of a different first section; and

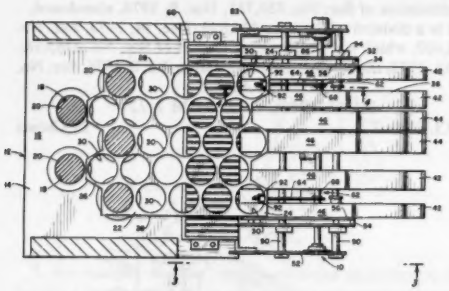
securing the ribbon ends to the piece.

4,075,963

SKELETON DISCHARGE MECHANISM FOR USE WITH CUPMAKER BLANK AND DRAW PRESSES AND THE LIKE

Terril M. Crago, Long Beach, Calif., assignor to Standun, Inc., Compton, Calif.

Filed Dec. 15, 1975, Ser. No. 640,938
Int. Cl.[2] B21D *43/00*; B21C *1/14*
U.S. Cl. 113—113 R **4 Claims**



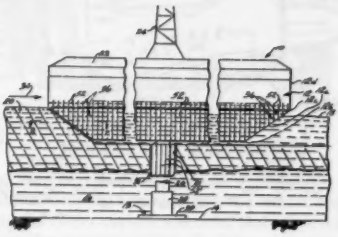
1. In a skeleton discharge mechanism for use with cupmaker blank and draw presses and the like of the type wherein the leading edge portions of completed scrap skeleton sheets, having precisely located hole means formed therethrough, are consecutively positioned ready for discharge on an exact timed basis by the press extending longitudinally into an entrance portion of the skeleton discharge mechanism; such that said hole means is positioned precisely at a pick-up station of said skeleton discharge mechanism entrance portion; the combination of: scrap sheet support means comprising a support surface projecting longitudinally away from said press between said entrance portion and an exit portion spaced away from said press for supporting said scrap skeleton sheet movable longitudinally therealong; sheet transportation means for longitudinally moving said scrap skeleton sheet along said support surface of said scrap sheet support means between said entrance and exit portions comprising a sheet engagement member, mounting means for mounting said engagement member movable on an exact timed basis in a closed longitudinal path to said entrance portion pick-up station of said support surface into sheet engagement only exactly through said hole means of said sheet leading edge portion and then longitudinally along said support surface to said exit portion pulling said sheet solely by said hole means engagement and then to spaced from said support surface disengaging said sheet and ultimately back to said entrance portion pick-up station of said support surface, said mounting means including means for selectively adjusting said engagement member closed longitudinal path of movement to selectively vary the exact longitudinal location along said support surface entrance portion to which said engagement member is moved into said sheet leading edge portion hole means engagement thereby varying the exact longitudinal location along said support surface entrance portion of said pick-up station constituting said exact predetermined location and adapting said engagement member and mounting means to hole means engaging and pulling scrap skeleton sheet of different longitudinal lengths.

4,075,964

ICE MELTING SYSTEM

Charles Norman Sjogren, San Gabriel, Calif., assignor to Global Marine, Inc., Los Angeles, Calif.

Filed Aug. 29, 1975, Ser. No. 609,030
Int. Cl.[2] B63B *35/08*
U.S. Cl. 114—40 **29 Claims**



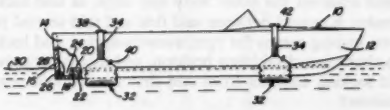
1. Heat transfer apparatus for melting a solid layer moving toward an object having an exterior heat conducting surface in the path of movement of the layer, the apparatus comprising a series of spaced apart, elongated grooves formed in the exterior surface and located proximately adjacent the portion of the solid layer a be melted, at least a portion of the grooves extending upwardly along said surface to a location above the top surface of the solid layer; and means for directing heat outwardly from the grooved surface to a portion of the layer located proximately adjacent the grooved surface, the grooves providing areas of heat concentration plus means for draining melted material away from between the solid layer and the grooved surface.

4,075,965

SYSTEM FOR RENDERING A MOORED HULL SELF-BAILING

Frank J. Lasch, 60 Manning Blvd., Albany, N.Y. 12207

Filed Jun. 18, 1976, Ser. No. 697,744
Int. Cl.[2] B63C *1/02*
U.S. Cl. 114—49 **1 Claim**



1. A system for preventing the accumulation of rain and spray water in a boat hull, at least one drain hole at the bottom of the hull which is normally plugged and rides beneath the water line, and a buoyant arrangement which may be transversely secured beneath the hull of the boat to buoy the latter to an elevation with the drain hole above the water line and the hull in a slight bow up attitude whereby the hole may be unplugged and any water tending to collect within the boat may be drained therefrom through the drain hole, said buoyant arrangement comprising a pair of elongated, flexible and independently inflatable flotation members removably secured transversely beneath the bow and stern of the boat so as to underride the hull, said inflatable members each having a longitudinal extent greater than the width of the hull, an elon-

gated, adjustable length tension member attached to and connected between the opposite ends of each inflatable member and passed over the upper side of said hull, each tension member comprising a pair of elastic straps secured at one pair of ends to the opposite ends of the corresponding inflatable member and including coacting releaseably securable and adjustable fastening means at their other pair of corresponding ends.

4,075,966

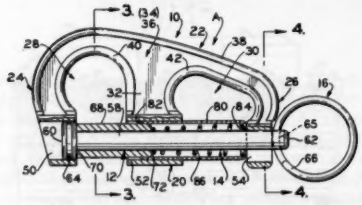
SPRING BIASED SNAP HOOK AND METHOD

A. Arthur Bates, Lakewood, Ohio, and Norman J. Cook, E. Greenwich, R.I., assignors to Zaleboats, Incorporated, East Greenwich, R.I.

Filed Aug. 20, 1976, Ser. No. 716,105

Int. Cl.² B63H 9/04

U.S. Cl. 114—114 **22 Claims**



16. A snap hook comprising:

a generally planar hook body having spaced apart inner and outer edges and spaced apart end edges, said body including first and second recess areas adapted to hold a jib stay and a jib, respectively, extending inwardly from said inner edge toward said outer edge with a body web area extending from said inner edge between said recess areas, said inner edge including coaxial locking member receiving openings spaced therealong with the common longitudinal axis of said openings being generally parallel to the plane of said body; an elongated locking member slidably received in said receiving openings for selectively closing said first and second recess areas, said locking member slidably received in said receiving openings for selectively closing said first and second ecess areas, said locking member being selectively longitudinally movable between a first normal position blocking both of said recess areas and a second position whereby at least one of said recess areas is opened, said locking member having inner and outer ends with the distance between said ends being such that when said locking member is in said first position the inner end thereof is slidably embraced by a receiving opening disposed adjacent one body edge with the outer end thereof protruding through a receiving opening disposed adjacent the other body end edge, as said locking member is moved between said first and said second positions; biasing means for continuously urging said locking member toward said first position, and means for moving said locking member from said first toward said second position.

4,075,967

HYDRODYNAMIC CABLE FAIRING

Trevor Ian Silvey, Sherborne, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

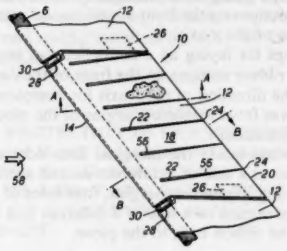
Filed Dec. 15, 1976, Ser. No. 750,816

Claims priority, application United Kingdom, Dec. 19, 1975, 52020/75

Int. Cl.² B63B 21/00

U.S. Cl. 114—243 **8 Claims**

1. A hydrodynamic cable fairing section comprising a nose portion, a body portion having two side surfaces, and vane means comprising a plurality of vanes connected to each side surface of said body portion, said plurality of vanes being substantially parallel to each other, wherein said nose portion has a continuous curved surface and a longitudinal through bore means for receiving a cable, said body portion extending from said nose portion and tapering from said nose portion



towards a trailing edge which forms part of the body portion, and each of said vanes comprises flat surfaces which taper toward said trailing edge of said body portion.

4,075,968

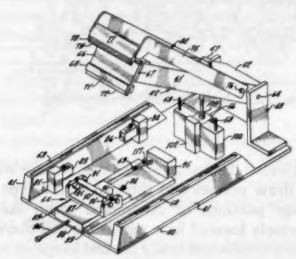
APPARATUS FOR MANUFACTURING CYLINDRICAL RESISTORS BY THICK-FILM SILK-SCREENING

Richard E. Caddock, 640 Sandalwood Court, Riverside, Calif. 92507

Continuation of Ser. No. 530,751, Dec. 9, 1974, abandoned, which is a division of Ser. No. 424,810, Dec. 14, 1973, Pat. No. 3,880,609, which is a continuation-in-part of Ser. No. 315,018, Dec. 14, 1972, abandoned. This application Jul. 8, 1976, Ser. No. 703,460

Int. Cl.² B05C 1/16; B41M 1/12

U.S. Cl. 118—7 **18 Claims**



1. Apparatus for effecting silk-screening of large portions of the cylindrical exterior surfaces of cylindrical substrates, including very small-diameter cylindrical substrates, which comprises:

a. a silk-screen assembly,

b. means to rotatably support a cylindrical substrate beneath the screen of said screen assembly, said means including first and second roller means respectively engaged with only the end regions of the exterior cylindrical surface of said substrate, the intermediate regions of said substrate being unsupported,

c. a squeegee mounted above said screen in registry with said substrate,

d. means to actuate said squeegee back and forth between an upper "release" position at which said squeegee is not pressing on said screen, and a lower "pressure" position at which said squeegee presses downwardly on said screen with sufficient pressure to force said screen against said substrate,

whereby movement of said screen assembly in a direction lateral to said substrate, when said squeegee is in said lower position, effects rotation of said substrate on said

roller means at a speed corresponding to the speed of movement of said screen assembly,

said actuating means comprising a first lever pivotally connected at one end to a support, the other end of said first lever being connected to said squeegee,

e. flood-bar means comprising a second lever pivotally connected at one end to said first lever,

the other end of said second lever being connected to a flood bar adapted to effect spreading of ink over said screen,

f. fulcrum means pivotally related to said second lever at a region located between said flood bar and said one end of said second lever,

said one end of said second lever being located between said fulcrum means and the pivotal connection between said first lever and said support, and

g. means to operate said squeegee actuating means to shift said squeefee from said lower "pressure" position to said upper "release" position when said lateral screening movement of said screen assembly has been completed.

4,075,969

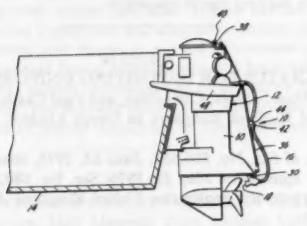
AUXILIARY WATER SYSTEM FOR OUTBOARD MOTOR

Edward R. Griffin, 415 Hereford Drive, Brookshire, Tex. 77423

Filed Feb. 16, 1977, Ser. No. 769,262

Int. Cl.² B63H *5/13*

U.S. Cl. 115—17 **8 Claims**



7. An auxiliary cooling water system for an outboard motor having a water jacket and a pair of ports communicating therewith, comprising

a conduit,

an element defining a scoop and a recess,

means for connecting said conduit to said element whereby said scoop provides the inlet to said conduit,

means connecting said conduit to one of said water jacket ports,

said recess adapted to receive a portion of the motor therein to position said scoop underwater facing in the direction of movement of the motor through the water, and

means for retaining said element in position with the portion of said motor received within said recess.

4,075,970

SPEED SELECTION FOR A DIRECT CURRENT PERMANENT MAGNET MOTOR

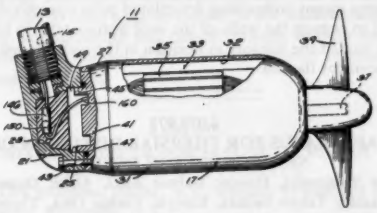
Charles H. Blake, Park City, and Donald H. Wood, Gurnee, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Division of Ser. No. 504,353, Sept. 9, 1974, abandoned. This application Mar. 26, 1976, Ser. No. 671,019

Int. Cl.² B63H *21/26*

U.S. Cl. 115—18 E **10 Claims**

1. An outboard motor comprising a shaft extending vertically under normal operating conditions and adapted to be connected to a boat hull, said shaft including a hollow interior, a lower housing fixedly connected to said shaft and including a hollow interior communicating with said hollow interior of said shaft, a permanent magnet, direct current electric motor including an armature winding having opposed terminals, said motor being mounted in said housing hollow interior and further including an output shaft including a first end extending exteriorly of said lower housing and a second end terminating within said hollow interior of said lower housing, a propeller mounted on said first end of said output shaft, a control circuit for said motor including a first resistor connected to one of said armature winding terminals and adapted for connection to a direct current source, a second resistor connected to said one armature winding terminal, a shunt lead connected to said one armature winding terminal, and a switch adapted for connection to the direct current source in parallel with said first resistor and selectively operable between a first position for connecting the direct current source to said shunt lead, a second position for connecting said direct current source to said second resistor, and a third position disconnected from both of said shunt lead and said second resistor, whereby to permit current flow from the current source to said armature solely through said first resistor, at least one of said resistors being located in said housing hollow interior in axially spaced relation from said output shaft, and a thermally conductive means fixedly bonding said resistor to said housing.



4,075,971

MOTOR HOUSING FOR A RETRACTABLE PROPULSION UNIT FOR BOATS

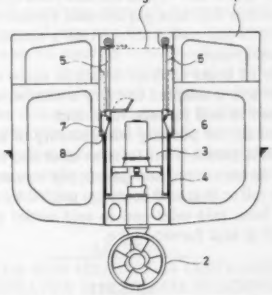
Jean-Pierre Reginensi, Grenoble, and Peter Slack, Echirolles, both of France, assignors to Alsthom-Atlantique S.A., Paris Cedex, France

Filed Apr. 11, 1977, Ser. No. 786,742

Claims priority, application France, Apr. 22, 1976, 76 11857

Int. Cl.² B63H *5/12*

U.S. Cl. 115—41 R **3 Claims**



1. In combination, a motor housing for a water vessel, said vessel having a well for up and down movement of said motor housing therein to permit an associated propulsion unit to be moved between an upper, retracted position with the housing and the propulsion unit inside the well and a lower, operating position with the propulsion unit projecting out of the bottom of the well, the upper part of the motor housing including first

clamping means for clamping the housing in the lower, operating position, said first clamping means comprising inclined articulated bolts operatively positioned to engage the walls of the well to provide a force with both a horizontal component and a vertical component, said well including a wall with a shoulder formed therein, the vertical component serving to clamp and seal the housing against said shoulder provided in the wall of the well and the horizontal component serving to hold the upper part of the housing in position in the well against lateral displacement therein, said lower part of the housing including second clamping means for clamping the housing in both the upper and the lower positions, said second clamping means comprising articulated bolts operatively positioned to engage the walls of the well horizontally to hold the lower part of the housing in position in the well against lateral displacement therein.

4,075,972

APPARATUS FOR THERMAL DIFFUSION OF SEMICONDUCTOR DEVICES

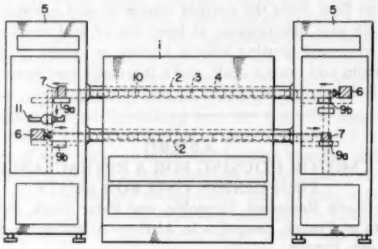
Masao Yamawaki, Handa; Katsuo Aoki, Aichi; Osamu Ina, Okazaki; Takao Suzuki, Kariya; Yoshio Oka, Toyota, and Kunihiko Hara, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 16, 1976, Ser. No. 714,806

Claims priority, application Japan, Aug. 20, 1975, 50-100863; Oct. 1, 1975, 50-119135; Oct. 30, 1975, 50-131025

Int. Cl.² C23C *13/12*

U.S. Cl. 118—6 **12 Claims**



1. A thermal diffusion apparatus for use in fabricating semiconductor devices comprising:

a furnace tube which is so controlled as to have a predetermined temperature distribution or gradient,

gas supply means laid in said furnace tube axially thereof for introducinga diffusion gas into said furnace tube through a plurality of gas outlets to provide a predetermined diffusion atmosphere,

a plurality of boats each of which is made of a refractory material and is adapted to carry a number of wafers to be processed in said furnace tube, and

pushing means for pushing said plurality of boats in contact with the adjacent boats from an inlet end to an outlet end of said furnace tube, said gas supply means functioning as a guide rail so that said boats are guided by said gas supply means from said inlet end to said outlet end when they proceed in said furnace tube.

4,075,973

APPARATUS FOR APPLYING FLOCK TO A SUBSTRATE

Joseph E. Geary, Rochester; Joseph Pelensky, Perry, and John Peter Hart, Leicester, all of N.Y., assignors to Champion Products Inc., Rochester, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,475

Int. Cl.² B05B *5/00*

U.S. Cl. 118—7 **5 Claims**

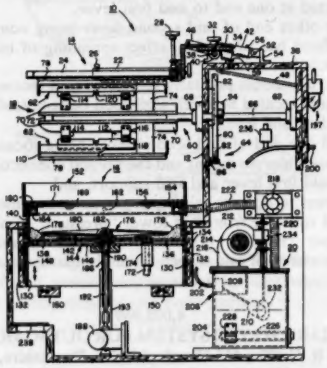
1. Apparatus for flocking a substrate comprising:

(a) a cabinet,

(b) a substrate holding turret apparatus,

(c) a screen holding apparatus located above the turret apparatus,

(d) a flock tray located between the turret apparatus and means for raising and lowering the flock tray,



(e) a high voltage electrode in the flock tray,

(f) means for energizing said electrode only after said flock tray has been raised to its up position adjacent said substrate holding turret apparatus.

4,075,974

APPARATUS FOR DEPOSITING UNIFORM FILMS

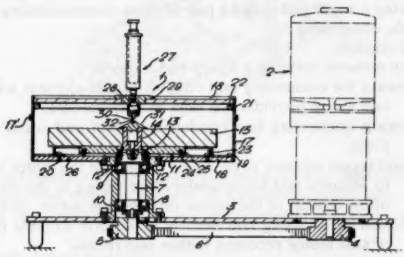
Graham Stuart Plows, Cambridge, and Paul Castle, Willingham, both of England, assignors to Decca Limited, London, England

Division of Ser. No. 586,632, June 13, 1975, abandoned. This application May 21, 1976, Ser. No. 688,562

Claims priority, application United Kingdom, Jun. 17, 1974, 26794/74

Int. Cl.² B05C *5/00, 11/08*

U.S. Cl. 118—52 **15 Claims**



1. Apparatus for forming a uniform film on a planar surface of a planar support the apparatus comprising a drivable turntable;

means for removably locating the planar support on the turntable;

a distributor, mounted for rotation with the turntable for distributing fluent material radially outwardly onto the planar surface of the planar support, the distributor having at least one portion extending axially from the turntable and defining a radially outwardly inclined conical surface for guiding the fluent material towards the planar surface;

a housing for enclosing the turntable and the support;

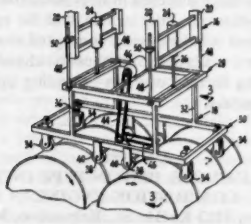
dispensing means defining an outlet for delivering a charge of fluent material to the distributor; and means for locating the dispensing means in the housing so that the outlet of the dispensing means is located over the distributor.

4,075,975

ROTATOR AND COATER SYSTEM FOR DRUM SHELLS

Donald E. Oswald, Foster City, Calif., assignor to Kaiser Steel Corporation, Oakland, Calif.

Filed Oct. 6, 1976, Ser. No. 730,028
Int. Cl.[2] B05B *13/06*
U.S. Cl. 118—318 4 Claims



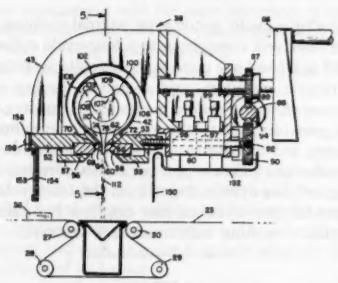
1. Drum handling apparatus comprising roller support means for supporting a horizontally disposed drum for rotation, and drum rotator and hold-down means operable to rapidly rotate a drum on said support means while suppressing horizontal and vertical movement of said drum, said rotator and hold-down means comprising an overhead frame, means supporting said frame for guided, reciprocatable, vertical movement, power rollers and idler rollers carried by said frame, depending therefrom, and adapted to engage and rotate said drum when said frame is moved downwardly, power means to move said frame downwardly and press said power and idler rollers against said drum and to thereafter move said frame upwardly, and a motor mounted on said frame, movable therewith, and driveably connected to said power rollers.

4,075,976

APPARATUS FOR CURTAIN COATING OBJECTS

A. Wiley Clayton, 1428 Maxwell Lane, Upland, Calif. 91786, assignor to A. Wiley Clayton, Upland, Calif.

Continuation-in-part of Ser. No. 448,017, Mar. 4, 1974, abandoned. This application Sep. 30, 1976, Ser. No. 728,336
Int. Cl.[2] B05C *5/00*
U.S. Cl. 118—324 35 Claims



1. A curtain coater for depositing material onto an object comprising:

a support;

a longitudinally split, resilient, tubular member;

a pair of knife members carried by said tubular member defining an orifice along the split, one of said knife members being attached to said support and the other knife member being movable to adjust the width of said orifice;

end closure means carried by said support and in engagement with each end of said tubular member in sealing relationship to form a chamber therein to contain coating material and to accommodate changes in the shape of said tubular member when the width of said orifice is adjusted, said end closure means each having a material passageway therethrough to said chamber, and comprising a cylinder attached to said support and having an orifice through its end, a movable piston having a tapered portion on one face in said cylinder, said piston and tapered portion having orifices coincident with said orifice in said cylinder to define said passageway, and means carried by said cylinder and piston for urging said piston to effect sealing between the piston face and an end of said tubular member around said tapered portion;

means for maintaining said chamber substantially full of the coating material to discharge through said orifice at a velocity to form a stable curtain of the material; and

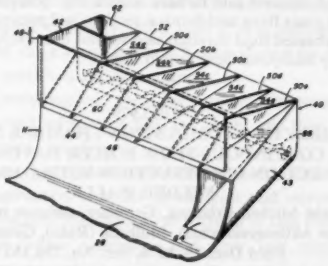
means for conveying said object through said curtain at a velocity to deposit a layer of the material of predetermined thickness.

4,075,977

MIXING HOPPER FOR MAGNETIC BRUSH DEVELOPING APPARATUS

James Ora Williams, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 12, 1977, Ser. No. 758,539
Int. Cl.[2] G03G *15/09*
U.S. Cl. 118—658 8 Claims



1. In a developer station of an electrographic copier or the like having a developer roller adapted to provide developer material to a photoconductor member and a transport roller for conveying such material to the developer roller, the improvement comprising:

an elongate hopper, means in the hopper defining a series of discrete storage compartments, said compartments of the hopper each receiving through a top portion thereof developer material returned from the developer roller, said compartments all tapering downwardly in the same direction relative to a horizontal plane so that developer material therein is urged by gravity toward a lower portion of each of the compartments, means in the hopper for deflecting developer material laterally in said one direction as it moves through each of the compartments, and a single auger outside the compartments for moving developer material in the opposite direction.

4,075,978

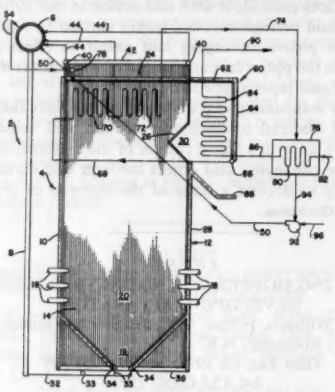
APPARATUS FOR HEATING A CONTAMINATED FEEDWATER FOR STEAM FLOODING

Jan L. Friedrich, Pompton Plains, and Ronald L. Davies, Newton, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Sep. 22, 1976, Ser. No. 725,616
Int. Cl.[2] F22B *1/08*; F22D *1/28*
U.S. Cl. 122—33 8 Claims

1. An apparatus for heating a fluid comprising a vapor generator including a furnace section for combusting a fuel and means to pass water in a heat exchange relation to said furnace

section to convert said water to steam; first heat exchange means disposed externally of said vapor generator in fluid flow communication with said furnace section for receiving said steam; said first heat exchange means including coil means through which said fluid is passed, said steam passing over said



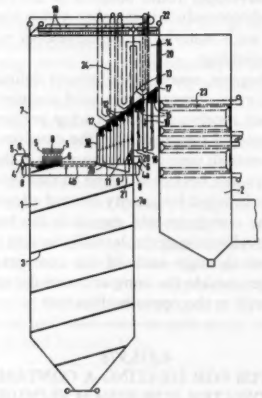
coil means to preheat said fluid; second heat exchange means disposed adjacent said furnace section for receiving the combustion gases from said furnace section; and means for passing said preheated fluid through said second heat exchange means to apply additional heat to said fluid.

4,075,979

ASSEMBLY OF A COMBUSTION CHAMBER NOSE IN A CONTINUOUS-FLOW BOILER HAVING A TWO-SECTION CONSTRUCTION WITH GAS-TIGHTLY WELDED WALLS

Rupprecht Michel, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Dec. 13, 1976, Ser. No. 750,163
Claims priority, application Germany, Dec. 19, 1975, 2557427
Int. Cl.[2] F22B *27/04, 29/06*
U.S. Cl. 122—235 A **3 Claims**



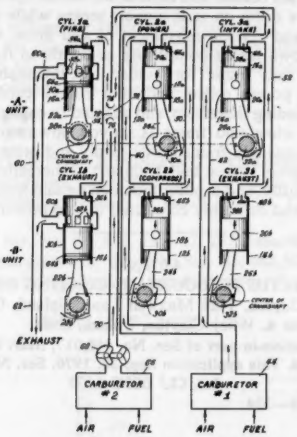
1. In a continuous-flow boiler having a two-section contruction with gas-tightly welded walls and having a structure forming a combustion-chamber nose disposed beneath a horizontal section connecting both sections of the two-section boiler and including combustion chamber walls formed of a helical winding made up of wound parallel tubes which terminate in transition headers located externally to the combustion chamber walls at a point of transition of the tubes into vertical-tube walls extending upwardly from the helical winding, the combustion-chamber nose having a forward edge and an upper nose incline extending for a given distance along the top of the helical winding toward a front wall of the combustion chamber walls, two of the transition headers being disposed respectively adjacent lateral walls of the combustion chamber and extending from the front wall and terminating at the forward edge of the combustion-chamber nose, the tubes of the helical winding, in the region of the nose, being bent upwardly unwelded, auxiliary headers being disposed in step-wise offset relationship to one another below the nose incline, and the upwardly bent tubes of the helical winding being connected to said auxiliary headers, the lateral walls of the combustion chamber above the nose incline being formed of tubes extending upwardly from said auxiliary headers.

4,075,980

MULTIPLE-CYCLE, PISTON-TYPE INTERNAL COMBUSTION ENGINE

Robert M. Anger, 3323 Konkle St., Kalamazoo, Mich. 49001

Filed Mar. 19, 1976, Ser. No. 668,476
Int. Cl.[2] F02B *75/20*
U.S. Cl. 123—1 R **15 Claims**



1. A multiple-cycle, piston-type internal combustion engine having a basic unit comprising two four-cycle cylinders operating 180° apart and one unit two-cycle cylinder firing 90° after the four-cycle cylinders, said cylinders having intake and exhaust port means, manifold means for channeling four-cycle exhaust gases directly to the unit two-cycle cylinder intake port means, and means for opening and closing the unit two-cycle intake and exhaust port means so correlated with the discharge of four-cycle exhaust from the four-cycle cylinders that expanded four-cycle exhaust can flow into said unit two-cycle cylinder without substantial back pressure.

4,075,981

ROTARY INTERNAL COMBUSTION ENGINE

David L. Durst, Fort Collins, Colo., assignor to Duane Burton, Boulder, Colo.

Filed Apr. 15, 1976, Ser. No. 677,337
Int. Cl.[2] F02B *53/08*
U.S. Cl. 123—8.31 **14 Claims**

1. A rotary internal combustion engine comprising:
   a. a housing including two confronting but spaced apart side casings having respective rotor support points in alignment with one another, said casings defining therebetween a plurality of chambers circumferentially spaced about said rotor support points, said chambers including
      i. a fuel-air chamber,

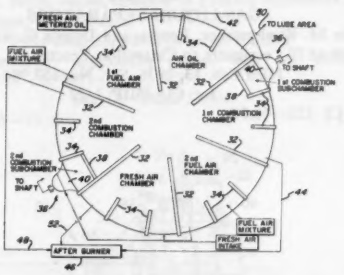
ii. an air-oil chamber,
iii. an air chamber, and
iv. a fuel combustion chamber including therein an area for a fuel combustion sub-chamber;

b. a shaft located between said casings and extending from one of said support points to the other support point, said shaft being mounted for rotation about its longitudinal axis;

c. a rotor located between said side casings and fixed at its center to said shaft for rotation therewith, said rotor including a plurality of radially outwardly extending, circumferentially spaced lobes moveable through said chambers during rotation of said rotor;

d. a plurality of main vane mechanisms respectively positioned between said chambers and cooperating with said rotor and side casings for substantially fluid sealing said chambers from one another between said rotor and side casings, each of said mechanisms including
i. a pair of elongated side vanes located on opposite sides of said rotor and in slidable engagement therewith, said side vanes being mounted for movement towards said rotor, and
ii. a cross vane extending between and connected with said side vanes across the outer periphery of said rotor and moveable toward said outer periphery, and
iii. means for biasing said cross vane in slidable engagement with said outer periphery;

e. means for moving said vane mechanisms in a radially



directed reciprocal fashion in synchronism with the rotation of said rotor so as to maintain said cross vanes in slidable engagement with the outer periphery of said rotor substantially continuously throughout the rotation of said rotor, said moving means including
i. a pair of substantially identical cam grooves located in opposite sides of said rotor in alignment with one another, said grooves being located inwardly of the outer periphery of said rotor and taking substantially the shape of said outer periphery, and
ii. a pair of side vane support grooves for each of said vane mechanisms, the side grooves of each pair being respectively located in said casings and facing said rotor, said side grooves extending radially outwardly from points adjacent said cam grooves to points adjacent the outer periphery of said rotor;

f. the side vanes of each vane mechanism being respectively located in a pair of said side grooves for radial movement therein, said side vanes including cam means located in said cam grooves so that during rotation of said rotor the interaction between said cam grooves and cam means causes said vane mechanisms to reciprocate radially in synchronism with said rotor to maintain said cross vane in engagement with the outer periphery of said rotor;

g. two pairs of sealing rings respectively located on opposite sides of said rotor between said rotor and said side casings and in sealing engagement with said rotor and casings, each pair of rings being comprised of an inner sealing ring located concentrically around said shaft radially inwardly of said cam grooves and an outer sealing ring located concentrically around said inner ring radially outwardly of said cam grooves, each pair of rings defining a circumferential oil receiving area therebetween;

h. means for delivering a predetermined mixture of fuel and air to said fuel-air chamber, said rotor, during rotation thereof, compressing said fuel and air mixture as one of the rotor lobes passes through the fuel-air chamber;

i. means for delivering said compressed mixture of fuel and air from said fuel-air chamber to said area in said combustion chamber, said last-mentioned means including
i. a passage extending from said fuel-air chamber to a point adjacent said combustion chamber, and
ii. a valve mechanism cooperating with said passage for metering a predetermined amount of said compressed mixture of fuel and air to said combustion chamber at predetermined points in time during rotation of said rotor, said valve mechanism including
a. a valve moveable between an opened position for allowing said compressed mixture to pass into said combustion chamber and a closed position for preventing said compressed mixture from passing to said combustion chamber, and
b. coupling means connected with said valve and cooperating with said rotating shaft so as to open and close said valve at predetermined times during the rotation of said shaft and said rotor;

j. means including said rotor for further compressing said compressed mixture of fuel and air in said area in said combustion chamber;

k. means for igniting said further compressed mixture within said combustion chamber to combust said mixture at a predetermined time during the rotation of said rotor so as to cause further rotation of said rotor, said combustion chamber cooperating with said compressed fuel-air chamber such that as said rotor rotates, the residue from the combustion of said fuel and air mixture passes into the overall combustion chamber;

l. passage means connected between said combustion chamber and a point outside the engine for directing said residue to said outside point;

m. means for delivering a predetermined mixture of air and oil to said air-oil chamber, said rotor, during rotation thereof, compressing said air and oil mixture as one of the rotor lobes passes through said air-oil chamber;

n. passage means connected between said air-oil chamber and said oil receiving areas defined by said sealing rings for directing said compressed mixture of air and oil from said air-oil chamber to said oil receiving areas, said mixture of air and oil entering said areas and passing up said side groove and into said cam grooves to provide lubrication between said cam means and said rotor and between said side vanes and said casings, said air and oil mixture in said side grooves also biasing said side vanes against said rotor;

o. said air chamber including air therein, said rotor, during rotation thereof, compressing said air as one of the rotor lobes passes through said air chamber; and

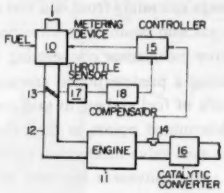
p. passage means connected between said air chamber and said outside point for delivering said compressed air from said air chamber to said outside point to mix with said residue.

4,075,982

CLOSED-LOOP MIXTURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH MEANS FOR IMPROVING TRANSITIONAL RESPONSE WITH IMPROVED CHARACTERISTIC TO VARYING ENGINE PARAMETERS

Masaharu Asano, No. 964, Shimonagaya-cho, Yokohama, and Kokichi Ochiai, No. 2-8-2, Nishitomi, Fujisawa, both of Japan

Filed Apr. 20, 1976, Ser. No. 678,598
Claims priority, application Japan, Apr. 23, 1975, 50-48605
Int. Cl.[2] F02B *33/00, 3/00, 7/00*
U.S. Cl. 123—32 EH **6 Claims**



1. An air-fuel mixture control system for an internal combustion engine wherein an exhaust composition of the engine is detected for controlling the air-fuel ratio of the mixture through a feedback loop at a predetermined value, comprising:

means for detecting an operating parameter of the engine indicative of a rich mixture or a lean mixture transitory demand condition;

means for generating an error compensating signal including means for differentiating the output from said detecting means, a first delay network effective to extend the duration of an input signal applied thereto to shape the input signal into a signal waveform having exponential slopes, a second delay network effective to extend the duration of an input signal applied thereto to shape the input signal into a signal waveform having exponential slopes, first polarity sensitive means connected to the output of the differentiating means for passing signals of a first polarity to said first delay network, and a second polarity sensitive means connected to the output of the differentiating means for passing signals of a second polarity to said second delay network to produce alternatively at the output of said first and second networks an output signal to represent said error compensating signal; and

means for combining the error compensating signal with a control signal representing the detected exhaust composition.

4,075,983

ELECTRONIC CIRCUITRY FOR MAINTAINING CONSTANT ENGINE SPEED FUEL INJECTION

Harold R. Robinson, Washington, D.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 25, 1976, Ser. No. 717,724
Int. Cl.[2] F02B *3/00*
U.S. Cl. 123—32 EA **5 Claims**

1. A fuel injection control circuit for an internal combustion engine having ignition distributive means and comprising:

means connected to the output of the distributive means for generating a pulse signal having a frequency directly proportional to engine speed;

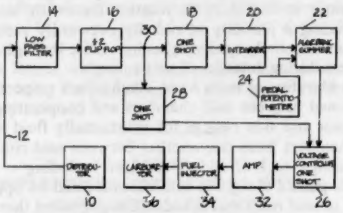
a first one shot multivibrator circuit responsive to the output of the generating means for regulating the pulse signal to ensure pulses of constant width;

means connected to the output of the first multivibrator circuit for integrating the output therefrom;

means responsive to an engine operator for producing a signal directly proportional to the position of an accelerator pedal;

means for algebraically summing the outputs of the integrating means and the operator responsive means for generating a control signal;

a voltage controlled one shot multivibrator circuit having a first triggering input furnished by a second one shot multivibrator circuit connected to the generating means output and a second input carrying the control signal for producing pulses having pulse width inversely proportional to the amplitude of the control signal; and



injection means connected to the output of the voltage controlled multivibrator circuit for fluidically delivering pulses of fuel corresponding to the output pulses from the voltage controlled multivibrator circuit;

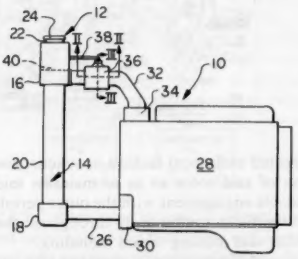
whereby the operating speed of the engine is maintained relatively constant.

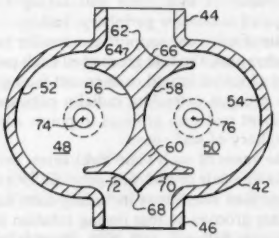
4,075,984

GAS-LIQUID SEPARATORS

Edwin M. Kirchgessner, Peoria, and Dennis G. Krohn, Pekin, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 13, 1976, Ser. No. 657,984
Int. Cl.[2] F01P *3/22*
U.S. Cl. 123—41.54 **6 Claims**





1. In an engine cooling system a liquid coolant fluid source, pump means for directing fluid from said coolant fluid source to an engine, heat exchanger means, conduit means for directing fluid from said engine to said heat exchanger means, said heat exchanger means serving to cool the fluid from said engine, conduit means further directing the fluid from said heat exchanger means to said coolant fluid source, centrifugal gas-liquid separator means in said conduit means for separating gas

from the liquid of said coolant fluid by centrifugal action, and gas-liquid separator means comprising a body having an inlet and outlet, a pair of chambers within said body each in communication with said inlet and said outlet, said inlet and said outlet being aligned so as to define a straight line flow path therebetween, said chambers symmetrically placed on opposite sides of and equidistant from said straight line flow path and from said inlet and said outlet, each said chamber having semi-circular curved walls extending equal distances from said straight line flow path and defining a center of curvature on a radius from said curved walls and also defining a curved flow path for said coolant fluid entering the chamber from said inlet and exiting through said outlet whereby entrained gas in said coolant fluid is directed away from said curved walls and toward said center of curvature, said body including a divider portion therein on said straight line flow path and intermediate said chambers, and wherein said semi-circular curved walls are located on said body and on said divider portion, said divider portion further including symmetrical, generally wedge-shaped inlet and outlet portions adjacent said inlet and outlet, respectively, said wedge-shaped portions being located on said straight line flow path, whereby flow of fluid may be reversed from outlet to inlet without impairing the gas-liquid separator efficiency, and further including vent means for venting said entrained gas from said center of curvature.

4,075,985

TWO CYCLE INTERNAL COMBUSTION ENGINES

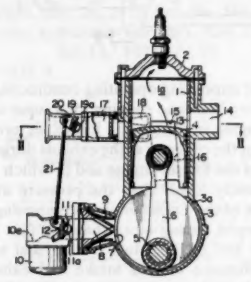
Tomio Iwai, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jun. 18, 1976, Ser. No. 697,681

Claims priority, application Japan, Jun. 20, 1975, 50-86128[U]; Jun. 20, 1975, 50-86129[U]

Int. Cl.² F02B *33/04*

U.S. Cl. 123—73 A **7 Claims**



1. Two cycle internal combustion engine comprising cylinder means, piston means disposed for sliding movement in said cylinder means and defining combustion chamber means of variable volume in one end of said cylinder means, crankcase means provided at the other end of the cylinder means and defining therein crank-chamber means having a volume which varies in response to the sliding movement of the piston means, exhaust port means formed in said cylinder means and connected with exhaust passage means, scavenging port means formed in said cylinder means, scavenging passage means having one end connected with said scavenging port means and the other end with said crank-chamber means, air passage means communicating through check valve means with the scavenging passage means for providing supply of air thereto, intake passage means communicating with the crank-chamber means and having throttle valve means provided therein, control valve means provided in said air passage means, means for actuating the control valve means so that it is opened in accordance with engine load condition, and said control valve means is connected through mechanical connecting means with the throttle valve means so that the former is opened as the latter is opened.

4,075,986

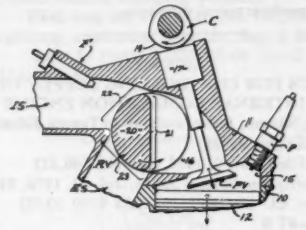
ROTARY-POPPET VALVE INTERNAL COMBUSTION ENGINE

Mark Keck, 60 Argonne, Belmont Shores, Calif. 90803

Filed Jul. 12, 1976, Ser. No. 704,169

Int. Cl.² F01L *1/28*

U.S. Cl. 123—79 R **17 Claims**



1. A four stroke internal combustion reciprocating piston and cylinder engine including; induction and exhaust stacks, blower means supplying air to said induction stack, a first valve means opening into the cylinder and controlling intake, compression, power and exhaust strokes thereof, and a second valve means opening sequentially (1) to divert induction air into the cylinder through said first valve means during the intake stroke, (2) to divert induction air into the exhaust stack during the compression and power strokes, and (3) to divert exhaust gases from cylinder and through said first valve means into the exhaust stack during the exhaust stroke, there being means for timing the said first and second valve means and for timed induction of fuel during the power stroke.

4,075,987

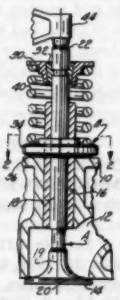
VALVE ROTATOR

Max J. Tauschek, South Euclid, and William A. Michaels, Seven Hills, both of Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Apr. 23, 1975, Ser. No. 570,749

Int. Cl.² F01L *1/32*

U.S. Cl. 123—90.3 **6 Claims**



1. A valve rotator comprising first and second parts movable relative to one another rotatably and axially, variable force applying means for applying a first and second force in a predetermined direction to move said parts toward one another, said second force having a magnitude substantially greater than the first force, shiftable elements positioned between said parts and engaged therewith and movable to relatively rotate said parts in response to axial movement of said parts toward each other, spring means acting on said shiftable elements and biasing the elements against movement due to axial movement of the parts toward each other, said spring means comprising means for applying a separating force through said shiftable elements to said parts which separating force is of a magnitude intermedi-

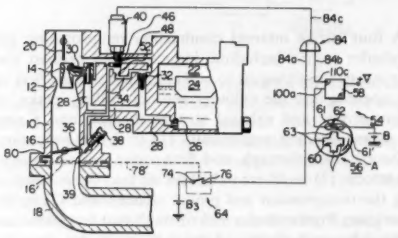
ate said first and second forces to move said parts axially away from one another, and rotation inhibiting means engagingly coacting between said parts and being completely separate from said spring means and said shiftable elements for inhibiting relative rotation between said parts in a direction opposite to said predetermined direction, said rotation inhibiting means being substantially ineffective to inhibit rotation between the parts in said predetermined direction.

4,075,988

APPARATUS FOR CONTROLLING SUPPLY OF FUEL TO INTERNAL COMBUSTION ENGINE

Takashi Kato, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Nov. 9, 1976, Ser. No. 740,221
Claims priority, application Japan, Jul. 22, 1976, 51-86499
Int. Cl.[2] F02O *11/10*; F02J *9/00, 33/02*
U.S. Cl. 123—97 B **3 Claims**



1. An apparatus for controlling the supply of fuel to an internal combustion engine provided with a carburetor which includes fuel passageway means adapted for communicating a fuel source with an intake system at a position located downstream of a throttle valve, said apparatus comprising:

valve means capable of opening and substantially closing said fuel passageway means;

means for sensing the engine during a running condition wherein the deceleration rate of the engine rotational speed is lower than a predetermined rate, while said throttle valve is substantially being closed, and;

means connected to said sensing means for operating said valve means so as to cause said fuel passageway means to be substantially closed while the engine is in said running condition in order to substantially stop the supply of fuel from said carburetor to said intake system.

4,075,989

METHOD FOR OPERATING 2-CYCLE INTERNAL COMBUSTION ENGINE

Masao Nagasawa, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

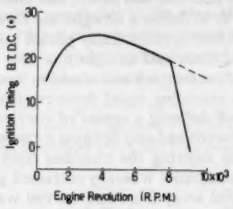
Continuation-in-part of Ser. No. 637,185, Dec. 3, 1975. This application Jun. 16, 1976, Ser. No. 696,848
Claims priority, application Japan, Dec. 9, 1974, 50-141928; Jan. 27, 1975, 50-12183; Mar. 5, 1975, 50-27492; Aug. 2, 1975, 50-107750; Jun. 28, 1975, 50-80418
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—117 R **4 Claims**

1. A method for operating a 2-cycle internal combustion engine having a combustion chamber comprising the steps of;

introducing an air-fuel mixture into said combustion chamber;

compressing the air-fuel mixture during the compression stroke of said engine;

igniting the compressed air-fuel mixture before said compression stroke ends, to thereby produce a power therein, the ignition timing for each igniting step being gradually advanced as the engine speed increases up to a set engine speed at which the engine can produce a maximum output power, the ignition timing being sharply and continuously



retarded as the engine speed increases above said set engine speed; and

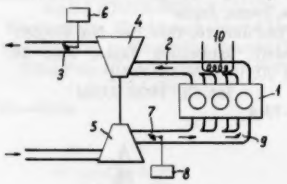
discharging the burnt gases.

4,075,990

DIESEL ENGINES

Jean Marie Ribeton, Mulhouse, France, assignor to Societe Alsa Clienne de Constructions Mecaniques de Mulhouse, France

Filed Jan. 28, 1975, Ser. No. 544,805
Claims priority, application France, Feb. 1, 1974, 74 03387
Int. Cl.[2] F02D *23/00*
U.S. Cl. 123—119 C **5 Claims**



1. A method of improving operating conditions, especially at starting and during low-load running, of a super-charged four-stroke Diesel engine in which the intake air pressure is normally higher than the pressure at the exhaust during the normal operating load of the Diesel engine and in which the intake air pressure is normally lower than the pressure at the exhaust during low loads of the Diesel engine, comprising keeping the exhaust valves open during more than the first half, but less than the second half of the intake stroke, and selectively increasing the difference in said intake and exhaust pressure existing on low loads to control the quantity of exhaust gases drawn from exhaust to the intake during the intake stroke.

4,075,991

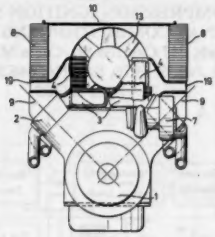
SUPERCHARGED WATER COOLED INTERNAL COMBUSTION ENGINE

Hermann Mettig, Rodenkirchen, and Bernhard Medenus, Bensberg-Lustheide, both of Germany, assignors to Klöckner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Division of Ser. No. 501,214, Aug. 28, 1974, Pat. No. 3,976,041. This application May 26, 1976, Ser. No. 690,247
Claims priority, application Germany, Aug. 28, 1973, 2343300
Int. Cl.[2] F02B *29/04*
U.S. Cl. 123—119 CD **3 Claims**

2. A water cooled internal combustion engine having a central axis which includes: a cooling blower arranged at one end face of said engine, at least one water cooler extending alongside said engine and operatively connected to said cooling blower, a supercharger air cooler arranged underneath said water cooler and in parallel alignment with the central axis of said engine, and means for directing the cooling air delivered by said cooling blower so that said cooling air flows through said supercharger air cooler in a direction perpendicular to the

central axis of said engine, said supercharger air cooler itself being provided with a gap forming an exit for the air to be discharged in one common direction from said supercharger air cooler and extending parallel to the path of the air to be discharged from said water cooler, cylinder rows in V-arrangement with one water cooler each over each of said cylinder rows, said water coolers and said supercharger air



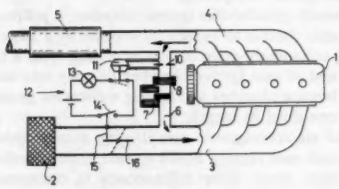
coolers being arranged to be passed through by air horizontally, said supercharger air coolers being arranged within that region of said water coolers which faces said engine and being located between said water coolers, said water coolers and said engine defining a gap therebetween, and each supercharger air cooler having an air discharge passage leading into said gap between said water coolers and said engine.

4,075,992

METHOD AND APPARATUS FOR REDUCING THE TOXIC COMPONENTS IN EXHAUST GAS

Ernst Linder, Muhlacker; Gunter Wossner, Esslingen; Helmut Maurer, Schwieberdingen, and Franz Rieger, Wasseralfingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 20, 1975, Ser. No. 560,555
Claims priority, application Germany, Mar. 27, 1974, 2414761
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **4 Claims**



1. An apparatus for exhaust gas detoxication, in an internal combustion engine which includes an induction tube, a throttle valve disposed therein, and an exhaust manifold, comprising:

(A) an exhaust gas recycle line, connected to establish flow communication between the exhaust manifold and the induction tube of the engine;

(B) valve means, disposed within said recycle line for controlling the gas flow therethrough;

(C) first orifice means, disposed within said recycle line between said valve means and the exhaust manifold;

(D) first pressure-sensitive switch means, communicating pneumatically with at least said recycle line to sense pressure conditions occurring in the vicinity of said first orifice means and near the connection of the exhaust gas recycling line to the exhaust manifold upstream of said first orifice means and occurring downstream of said first orifice means;

(E) warning signal means in circuit with said first switch means and influenced thereby, for producing a warning signal capable of being sensed and related to the gas flow in said recycle line; and

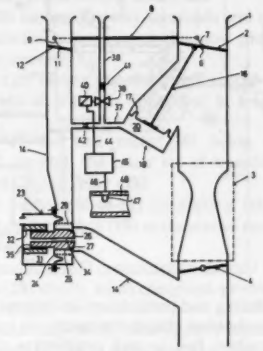
(F) second switch means, connected in electrical series with said warning signal means, actuated by the throttle valve of the engine.

4,075,993

FUEL MIXTURE CONTROL APPARATUS

Johannes-Gerhard Bertling, Vaihingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 24, 1976, Ser. No. 717,379
Claims priority, application Germany, Sep. 3, 1975, 2539099
Int. Cl.[2] F02M *23/00, 23/04, 11/02*
U.S. Cl. 123—119 EC **24 Claims**



2. In an apparatus for controlling the fuel mixture of an internal combustion engine, said engine including a fuel mixture generator and an air intake tube in which is disposed a throttle valve, the improvement comprising, in combination:

an air bypass conduit, terminating in said air intake tube downstream of said throttle valve for supplying supplementary air to said intake tube;

first flow control means, disposed within said bypass conduit, for adjusting the free flow cross section

an air flow rate meter, disposed in said air intake tube upstream of said mixture generator and including a movable air flow control element, actuated by the difference between a reference pressure and the pressure downstream of said air flow rate meter and coupled to said first flow control means for simultaneous actuation of said meter and said first flow control means;

a pressure control valve disposed in said air bypass line downstream of said first flow control means;

a connecting line for establishing communication between a region of said air bypass conduit defined by lying upstream of said pressure control valve and by lying downstream of said first flow control means and said air flow rate meter to provide a reference pressure therefor;

a source of constant pressure, connected to said air flow rate meter; and

adjustable valve means associated with said source of constant pressure for changing said reference pressure.

4,075,994

INTERNAL COMBUSTION ENGINE OPERATION UTILIZING EXHAUST GAS RECIRCULATION

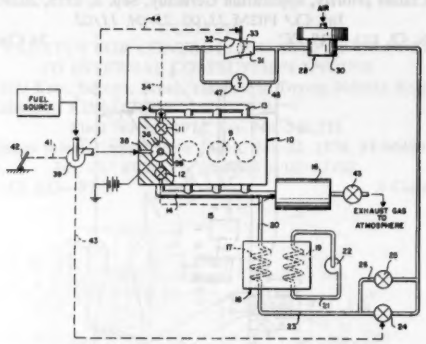
Edward A. Mayer, Newburgh, and Donald W. Plungis, Fishkill, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 533,588, Dec. 17, 1974, Pat. No. 4,011,845, which is a continuation of Ser. No. 295,064, June 2, 1972, abandoned. This application Sep. 27, 1976, Ser. No. 726,718
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A **7 Claims**

1. Method for operating an internal combustion engine having a combustion chamber including intake and exhaust valves,

in which a hydrocarbon fuel is admixed with a combustion supporting gas to form a combustible mixture, the ignition and burning of which combustible mixture produces a hot exhaust gas stream containing a portion of NO_x, which method reduces the NO_x content within the exhaust gas emitted from said engine and comprises the steps of;

(a) forming a preliminary combustion supporting gaseous mixture, comprising a major portion of air, together with a minor portion of said hot exhaust gas stream,



(b) introducing said preliminary air-exhaust gas mixture into said combustion chamber whereby to intermix with said hydrocarbon fuel in said combustion chamber, and to render at least a segment of said air-exhaust gas preliminary mixture combustible,

(c) igniting said combustible mixture within said chamber, and

(d) segregating a portion of the hot exhaust gas thereby created, to form said preliminary combustion supporting mixture.

4,075,995

FUEL INJECTION SYSTEM

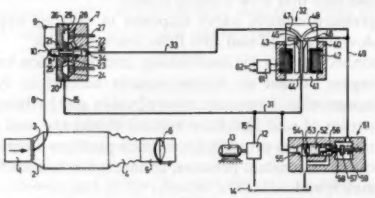
Manfred Krämer, Schwieberdingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 20, 1976, Ser. No. 650,735

Claims priority, application Germany, Jan. 21, 1975, 2502153

Int. Cl.[2] F02M *69/00*

U.S. Cl. 123—139 AW **5 Claims**



1. A fuel injection system for an internal combustion engine, said engine including a fuel tank, an air induction tube containing an air flow rate meter and a throttle valve and transducer means for generating signal related to engine conditions, said fuel injection system including a source of pressurized control fluid and fuel metering means incorporating a control slide which is displaced in one sense by said air flow rate meter and which is urged in the opposite, return, sense by control fluid, the improvement comprising:

an electromagnetic fluid pressure modulator, having a housing and an outlet connected to said control slide for exerting variable pressure on said control fluid, said pressure modulator having internal fluid compartments in said housing and including electromagnetically actuated means for adjusting the spatial direction of the flow of fluid selectively within said compartments and toward said outlet to thereby determine the static pressure at said outlet and at said control slide, said modulator being connected to said transducer means to receive said signals related to engine conditions.

4,075,996

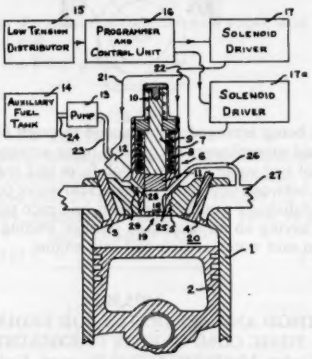
EXTERNAL COMPRESSION IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Charles A. Hisserich, 447 Cabrillo St., Costa Mesa, Calif. 92627

Filed Jan. 5, 1976, Ser. No. 646,569

Int. Cl.[2] F02P *21/00*

U.S. Cl. 123—143 A **11 Claims**



1. An internal combustion engine comprising a main combustion chamber, means to supply a main charge of a lean fuel-air mixture thereto, and

an ignition system comprising

an igniter, a source of auxiliary igniter fuel and air, feed means to feed an igniter charge thereof to said igniter, and control means connected to said feed means and igniter;

said igniter comprising

a small cylinder-like igniter chamber, a piston-like ram slidable therein to reduce its volume by a large factor,

a permanently-open orifice extending from a bottom orifice end of said igniter chamber directly into said main combustion chamber and having a diameter greater than about one-third its length,

and electromagnetic ram driving means disposed to drive said ram rapidly down to said bottom orifice end in less than about three milliseconds to compress said igniter charge adiabatically to ignition temperature to form a jet of flame spurting out through said orifice to ignite said main charge.

4,075,997

SPARK IGNITION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

William Frank Hill, Stafford, England, assignor to Lucas Electrical Co., Limited, Birmingham, England

Continuation of Ser. No. 515,067, Oct. 15, 1974, abandoned. This application Jun. 1, 1976, Ser. No. 691,439

Claims priority, application United Kingdom, Oct. 19, 1973, 48845/73

Int. Cl.[2] F02P *1/02*

U.S. Cl. 123—148 E **4 Claims**

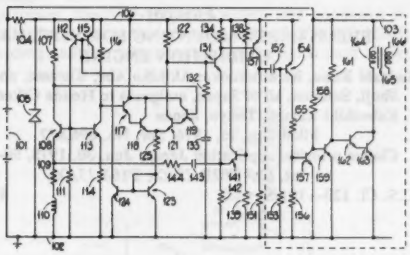
1. A spark ignition system for an internal combustion engine comprising:

a variable reluctance pick-up for producing output pulses which change in polarity when sparks are to be produced;

a spark circuit operated by said output pulses; and

control means for coupling said variable reluctance pick-up to said spark circuit, said means including an operational

amplifier, an input resistor, connecting said pick-up directly to said amplifier input, and an AC negative feedback path comprising a resistor and a capacitor in series between the output and input of the operational amplifier, such that each pulse from said pick-up drives the amplifier



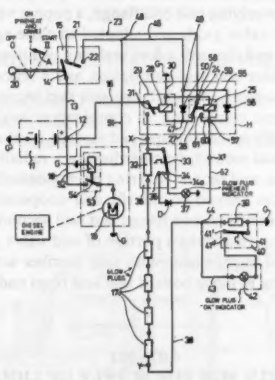
relatively slowly into saturation when the pick-up pulse is of one polarity and drives the amplifier relatively quickly out of saturation when the pulse changes polarity, said spark circuit operating to produce a spark when said amplifier is driven out of saturation.

4,075,998

ELECTRICAL ON-OFF-STARTING OPERATION CONTROL SYSTEM FOR ENGINES REQUIRING PRE-HEAT TIME, SUCH AS AUTOMOTIVE DIESEL ENGINES

Heinz Krauss, Stuttgart; Gunther Kauhl, Asperg, and Leo Steinke, Waiblingen-Hegnach, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 4, 1977, Ser. No. 765,832
Claims priority, application Germany, Mar. 19, 1976, 2611594
Int. Cl.[2] F02N *17/00*
U.S. Cl. 123—179 H **10 Claims**



1. Electrical ON-OFF-START operation control system for engines requiring a pre-heat time before starting, such as automotive-type Diesel engines having

a source of electrical power (**11, 12**);

a starter motor (**M-19**); and a starter switch means (**18, 52, 53, 54**) therefor selectively connecting the motor (**19**) to the source;

a manually operable control switch (**15, 20**) having the positions, in sequence; OFF (O); ON (I); START (II); and corresponding ON (**21**) and START (**22**) terminals and a movable switch member (**14**) connected to said source;

a glow plug energization circuit (**X-17-38-G**) including at least one glow plug (**17**) and a heating element (**32**) — temperature sensitive switch (**36**) in heat transfer relation to the heating element (**32**);

wherein, in accordance with the invention,

the START position of the control switch (**15**) is unstable and includes means (A) biassing the switch to return to the ON position upon release of manual operation after having moved the switch through the ON position to the START position,

said switch being connected to form in the single ON position simultaneously a pre-heat connection for the glow plug or glow plugs;

and wherein the system further comprises

a first relay (**29**) having its relay terminals and switch element (**31**) selectively connecting the glow plugs (**17**) directly to the source (**11**);

a second relay (**25**) having transfer terminals (**24-26**; **24-61**), one set (**24-61**) of which is connected in a self-holding circuit;

the coil (**28**) of the first relay (**29**) being connected (**30-28-27-23**) through the other set of transfer contacts (**26-24**) of the second relay (**25**);

a start control circuit (**46-48-51**) connecting said START terminal (**22**) of the switch (**15**) to the starter switch means (**18, 52, 53, 54**);

an energizing junction (**57**) connected to the coil (**59**) of the second relay (**25**) which, when energized, provides energization to the coil;

a diode (**56**) connecting (**46-55**) said START terminal (**22**) of the control switch (**15**) to the energizing junction (**57**);

and a further diode (**50**) connecting (**46-49-47**) said START terminal (**22**) of the control switch (**15**) to the coil (**28**) of the first relay (**29**).

whereby said further diode (**50**) and the connection thereof to the START terminal will be in parallel with the connection of the coil (**28**) of the first relay (**29**) through the other set (**24-26**) of the transfer contacts of the second relay (**25**),

said diodes (**56, 50**) being poled in conductive direction with respect to said source;

said energizing junction (**57**) being further connected (**60**) to said one set of transfer contacts (**24, 61**) of said second relay (**25**) to form said self-holding circuit, and being additionally connected (X', **62**) to said temperature sensitive switch (**33, 36**) to be energized thereby when the temperature to which said switch is exposed is above a predetermined level to provide energization current to the junction (**57**) and hence to the second relay (**25**) when the temperature as sensed by said temperature sensitive switch (**36**) is indicated to be adequate to permit starting and operation of the engine.

4,075,999

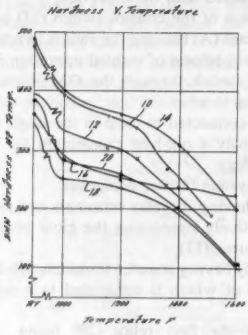
HARD FACING ALLOY FOR ENGINE VALVES AND THE LIKE

Louis J. Danis, Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 9, 1975, Ser. No. 585,272
Int. Cl.[2] F02B *19/00;* **F01L** *3/04;* **B32B** *15/04*
U.S. Cl. 123—191 A **7 Claims**

1. An article of manufacture comprising an internal combustion engine component having a portion which is simultaneously subjected to abrasive wear and combustion oxide induced corrosion at elevated temperatures and having said portion coated with a nickel based alloy consisting essentially of: about 1.0 to 3.5 percent by weight carbon, about 25 to 40

percent by weight cromium, about 3 to 12 percent by weight molybdenum, and about 40 to 70 percent by weight nickel.



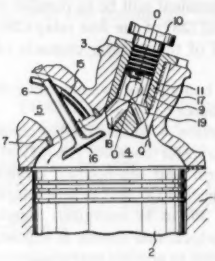
4. The structural element of claim 1 where said engine component is a precombustion chamber for an internal combustion engine.

4,076,000

INTERNAL COMBUSTION ENGINE HAVING AN AUXILIARY COMBUSTION CHAMBER WITHOUT AN INTAKE VALVE

Kenji Goto, and Takao Tate, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 15, 1976, Ser. No. 677,288
Int. Cl. F02b *23/00*
U.S. Cl. 123—191 S **15 Claims**



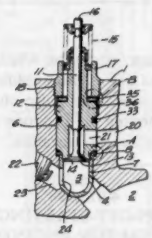
1. An internal combustion engine having an auxiliary combustion chamber without an intake valve comprising:
a cylinder;
a cylinder head;
a piston in said cylinder;
means defining an intake port in said cylinder head;
said piston, said cylinder, and said cylinder head defining a main combustion chamber;
said intake port opening into said main combustion chamber;
an intake valve, having a disc portion, operatively associated with said intake port;
means, having an interior wall, defining an auxiliary combustion chamber, having no intake valve, positioned adjacent said intake port;
an ignition plug having an electrode within said auxiliary combustion chamber; and
means defining a plurality of passage means fluidly intercommunicating said main combustion chamber and said auxiliary combustion chamber, a first one of said passage means opening toward a stream of sucked gas deflected by the disc portion of said intake valve in said main combustion chamber, with the direction of flow therein intersecting at an acute angle with the interior wall of the means defining the auxiliary combustion chamber lying symmetrical with respect to a central longitudinal axis thereof, a second one of said passage means opening at a position remote from the intake valve, the central axis of the second passage means being not in a plane containing the central axis of the first passage means whereby the interior of the auxiliary combustion chamber is loop-scavenged.

4,076,001

PRECHAMBER MOUNTING FOR INTERNAL COMBUSTION ENGINE

Tadashi Kuno, Kamifukuoka; Akihiko Abe, Kurume, and Akito Shoji, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 16, 1976, Ser. No. 696,827
Claims priority, application Japan, Jun. 30, 1975, 50-92063
Int. Cl.² F02B *23/00*; F16J *15/00*
U.S. Cl. 123—191 S **4 Claims**



1. In an internal combustion engine having a stationary member, a portion of said member forming one wall of a main combustion chamber, said member having a bore provided with a first annular shoulder, a liner insertable into said bore, said liner having an outward extending radial end flange overlying said shoulder, said liner defining an auxiliary combustion chamber therein and having an opening in one wall thereof, said opening forming a flame passage connecting said chambers, a valve guide insertable into said bore and having a second shoulder overlying said end flange, a poppet valve slidably guided on said valve guide and adapted to close against a seat formed at one end thereof, a first seal ring positioned between said first shoulder and said end flange, and a second seal ring positioned between said end flange and said second shoulder, the improvement comprising, in combination: said end flange having a radially extending stepped surface on the upper surface thereof, said second shoulder having a radially extending stepped surface, said second seal ring having radially extending stepped surfaces shaped to interfit and cooperate with said stepped surfaces of said end flange and said second shoulder, a Belleville spring encircling a portion of said valve guide, and a nut in threaded engagement with said member acting on said Belleville spring to place both of said seal rings under compression.

4,076,002

APPARATUS FOR THE SUPPLY OF LIQUIDS IN FINELY-DIVIDED FORM TO AN INTERNAL COMBUSTION ENGINE

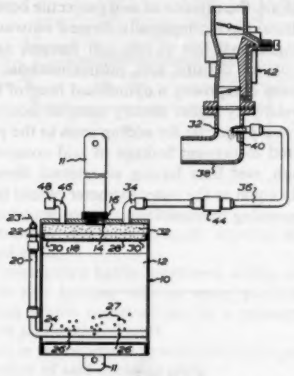
Allan Mellqvist, Balzarsgatan 8, 211 36 Malmo, and Thorild Nils Kristian Ewald Anderberg, Papegojvagen 3, 230 11 Falsterbo, both of Sweden

Filed Apr. 16, 1976, Ser. No. 677,847
Claims priority, application Sweden, Apr. 18, 1975, 7504498
Int. Cl.² F02B *47/02*
U.S. Cl. 123—198 A **1 Claim**

1. In an apparatus for supplying liquid in finely divided form to an internal combustion engine, said apparatus being of the type including a closed container having therein liquid, apertured distribution means in a lower region of said container for introducing air into said liquid in said container, whereby said

air passes upwardly through said liquid and is moistened thereby, said air entraining therein said liquid in finely divided form, and conduit means having a first end connected to said container at the upper end thereof and a second end discharging into the intake manifold of an internal combustion engine for conveying entrained liquid to said engine, the improvement comprising:

baffle means, fixedly positioned within said container at a position adjacent a maximum upper level of said liquid, for dividing said air and lengthening the flow path thereof



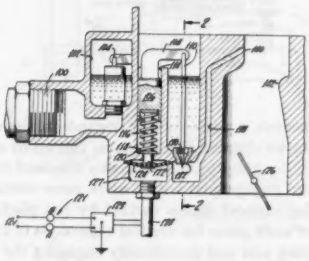
through said liquid, said baffle means comprising a plate extending across the entire cross-sectional area of said container, said plate having elongated slits therein at positions adjacent the outer periphery thereof, the remaining area of said plate being impervious to the passage therethrough of said air, whereby the positions of said elongated slits cause said flow path of said air through said liquid to be lengthened, thus maximizing the effective entrainment of said liquid by said air, and whereby the dimensions of said slits cause said air to be divided.

4,076,003

SPLIT ENGINE VACUUM CONTROL FUEL METERING SYSTEM

Arthur Garabedian, Fullerton, Calif., assignor to Dudley B. Frank, Santa Ana, Calif.

Filed Nov. 5, 1975, Ser. No. 629,178
Int. Cl.² F02D *17/00*
U.S. Cl. 123—198 F **7 Claims**



1. A split engine carburetor for independently controlling the flow of fuel to respective halves of the number of an engine's cylinders, said carburetor comprising:

a first fuel path located in said carburetor;

a second fuel path located in said carburetor, said first fuel path in fluid communication with one-half of said cylinders, said second fuel path in fluid communication with the other half of said cylinders;

valving means for controlling the flow of fuel through said second fuel path to said other half of said cylinders, said valving means in fluid communication with an intake manifold of said one-half of said cylinders;

means connected to said valving means for biasing said valving means toward an open position; and

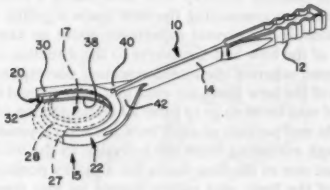
means connected to said valving means and responsive to a specified vacuum in said intake manifold for moving said valving means toward a closed position, said engine operating on only said one-half of said cylinders when said vacuum in said manifold is above said specified level by closing said valving means and preventing said fuel flow to said other half of said cylinders.

4,076,004

HAND LAUNCHER FOR CLAY PIGEONS

Urban A. Huelskamp, Dayton, Ohio, assignor to MTM Molded Products Co., Dayton, Ohio

Filed Jan. 13, 1977, Ser. No. 759,235
Int. Cl.² F41B *5/00*
U.S. Cl. 124—5 **3 Claims**



1. A unitary hand launcher for clay pigeons formed of a single piece of resilient material, comprising:

a. a handle portion,

b. a flexible neck portion extending from said handle portion,

c. a head portion extending from said neck portion on the end of said launcher opposite said handle portion, said head portion including:

i. a trailing arm extending outwardly and laterally away from said neck portion, the end of said trailing arm opposite said neck portion being substantially straight,

ii. a substantially curved leading arm extending outwardly and laterally from said neck portion opposite said trailing arm, said arms being shaped to define a substantially circular opening therebetween having a diameter substantially the same as the outermost diameter of a pigeon, for receiving a pigeon within said opening,

iii. upper and lower opposed flanges which are substantially symmetrical with respect to one another and extend inwardly from the upper and lower edges of said leading and trailing arms to reinforce said arms, and are spaced to define a channel for receiving the outermost rim of the pigeon therein, said arms defining the base of said channel, said flanges defining the sides thereof, and said arms and flanges being shaped to surround more than 50% of the perimeter of the pigeon when fully seated within said channel,

iv. said flanges also being sized to define an opening between the arms having a diameter less than the outermost diameter of the pigeon and greater than the diameter of any rims on the pigeon located inwardly from the outermost edge of the pigeon, to receive a pigeon individually in said channel and to cause a pigeon to contact said head portion of the launcher along only the base and sides of the channel and to be substantially free of contact with the inner edges of the flanges,

d. leading and trailing reinforcement webs extending respectively between and attached substantially rigidly to said leading and trailing arms and said neck portion to rigidify and substantially immobilize at least the portions of said

arms adjacent said neck portion, the remainder of said arms and flanges being sufficiently resiliently flexible to be pried apart at their outer ends for insertion and ejection of a clay pigeon into and from said openings, and

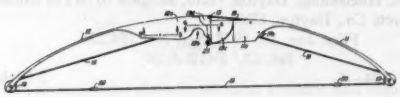
e. said channel accepting a pigeon therein equally well in upright or inverted positions to provide for inverting the hand launcher for launching a clay pigeon equally well with either the right or left hand.

4,076,005

ARCHERY BOW

James H. Hill, 995 W. 100 South, Provo, Utah 84601

Filed Aug. 2, 1976, Ser. No. 710,432
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—24 R **15 Claims**



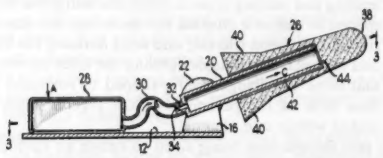
1. A foldable archery bow comprising a pair of limbs and hinge means connecting the bow limbs together in end-to-end relationship for pivotal movement about an axis adjacent the back of the bow and transverse to the direction of the draw of the bow, wherein the interconnected, corresponding end portions of the bow limbs are enlarged with respect to the remainder of said limbs so as to form a handle portion of the bow; the handle end portion of each bow limb has a passageway therethrough extending from the bellyside to the backside thereof; at least one of the bow limbs has a pulley positioned at the tip end of the limb, said pulley having its axis transverse to the plane of the bow; and a bowstring is provided, extending from the tip end of the other bow limb to and around the pulley at the tip end of the first bow limb, through the passageway in the handle end portion of said first bow limb to the backside of the bow, then through the passageway in the handle end portion of said other bow limb, and to its origin at the end of said other bow limb, whereby the bow limbs can be rotated from their aligned, operable position to a folded position in which said limbs are adjacent each other with the backs thereof facing each other.

4,076,006

TOY ROCKET WITH PNEUMATIC LAUNCHER

Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Continuation-in-part of Ser. No. 623,756, Oct. 20, 1975, abandoned. This application Jul. 29, 1976, Ser. No. 709,651
Int. Cl.[2] F41B *11/00*
U.S. Cl. 124—64 **4 Claims**



1. A toy rocket, comprising:

launching means including a base portion for positioning on a suitable supporting surface, a hollow cylindrical, elongated launching tube for holding a projectile before launching, said launching tube being pivotally mounted to the base portion by a trunion shaft formed integrally with said launching tube including at least one enlarged end providing a thumbwheel handle to facilitate manual pivoting of the launching tube relative to the base portion, means removably mounting said trunion shaft comprising an arcuate surface for engaging said shaft and providing a snap-fit therewith for frictionally maintaining the shaft therein at any predetermined angle and a generally rectangular, molded, flexible air impact bulb having a conduit in communication with said launching tube, said bulb being positioned on top of said base and adapted to withstand sudden impact by a user whereby the resultant compressed air is transmitted from the bulb through the launching tube; and

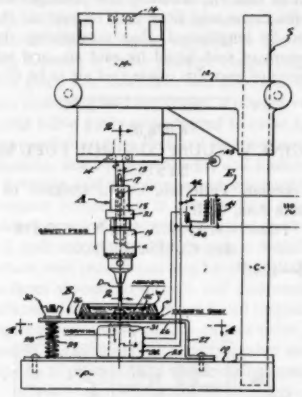
a projectile having a receiving means therein positionable over said launching tube to receive the impact of said compressed air, the exterior of said projectile being generally cylindrical having integrally formed outwardly protruding longitudinal fins at one end thereof, and being fabricated of low density, soft, porous material, said receiving means comprising a cylindrical liner of rigid impervious, relatively higher density material secured to the interior of said projectile for adding mass to the projectile for flight and to prevent leakage of said compressed air therethrough, said liner having an internal diameter approximately equal to the outer diameter of said launching tube for mounting thereon.

4,076,007

GEMSTONE DRILL

Eugene E. Redlin, 10764 Freer St., Temple City, Calif. 91780

Filed Mar. 29, 1976, Ser. No. 671,056
Int. Cl.[2] B28D *5/00*
U.S. Cl. 125—30 R **5 Claims**



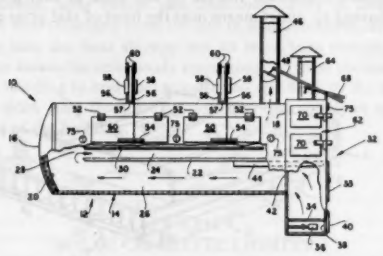
1. In combination, a platform with a stand projecting vertically therefrom, an abrasive drill assembly carried by the stand and depressible by gravity on a vertically disposed rotational cutting axis into engagement with a work piece cutting zone, and a vibrating support means carried by the platform and supporting the work piece for vertical excursions in alignment with said cutting axis and periodically engaging the said depressible abrasive drill assembly, said vibrating support means comprising a caliper-shaped body fixed to said platform by a lower arm thereof and with an upper arm thereof carrying the work piece underlying said cutting zone, there being spring means lifting the said upper arm and adjustment means restricting lifting thereof, whereby the vibratory lift means alternately lifts and supports the work piece and the drill assembly engaged thereon by means of excursions aligned with the rotational axis.

4,076,008

BARBECUE APPARATUS AND METHOD

Guy W. Deaton, 6393 Walker Road, Riverdale, Ga. 30296

Filed Sep. 27, 1976, Ser. No. 726,767
Int. Cl.[2] A47J *37/07*
U.S. Cl. 126—25 R 6 Claims



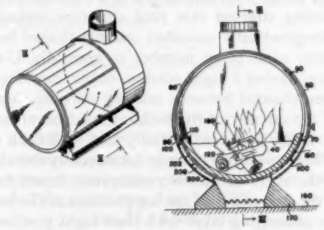
1. A barbeque oven comprising:
a horizontally disposed elongate housing having two enclosed ends;
a heat conductive baffle positioned within said housing to divide said housing into an upper portion and a lower portion which communicate by a passageway adjacent one of said enclosed ends;
a firebox in communication with said lower portion adjacent the other of said enclosed ends;
a flue means in communication with said upper portion adjacent said other of said enclosed ends; and
an insulating means positioned in said lower portion adjacent said other of said enclosed ends and in a position to reduce the direct transfer of heat from said firebox through said baffle into said upper portion by an amount sufficient for said upper portion to be of a substantially uniform temperature along its length in response to the flow of combustion gases from said firebox through said lower portion, said passageway and said upper portion into said flue means.

4,076,009

FIREPLACE

Harold W. Hannebaum, Bellevue, Id., assignor to The Raymond Lee Organization, Inc., a part interest

Continuation-in-part of Ser. No. 580,808, May 27, 1975, Pat. No. 3,986,488. This application Jun. 21, 1976, Ser. No. 698,257
Int. Cl.[2] F24B *1/02*
U.S. Cl. 126—120 5 Claims



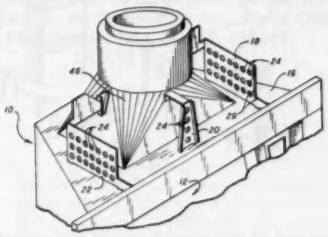
1. A fireplace, comprising:
a hollow, generally cylindrical casing with horizontal axis and with closed ends and having two parallel elongated horizontal air intake slits parallel to the axis, said slits extending rearwardly along the curved surface of the casing to an end point intermediate the ends of the casing;
a base having a top section in the form of a horizontally elongated hollow bottom half cylinder provided with means for receiving and supporting the bottom portion of said casing, thereby forming a space between said section and said bottom portion which communicates with said slits, said base having a hollow vertical air intake duct connected between a bottom air intake opening in the base and said space to feed air from the outside of the base into the interior of the casing, said base supporting the casing upon a horizontal surface; and
a vertical partition placed at the endpoint and dividing the casing into a fire chamber and an exhaust chamber, the partition restricting all communication between the chambers to an opening between the casing and the bottom of the partition.

4,076,010

FACTORY-BUILT FIREPLACE SPACER CONSTRUCTION

George M. Andrews, Syracuse, N.Y., assignor to Vega Industries, Inc., Syracuse, N.Y.

Continuation of Ser. No. 597,394, Jul. 18, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,442
Int. Cl.[2] F24B *1/18*
U.S. Cl. 126—120 10 Claims



1. A factory built fireplace unit for enclosure by combustible framing members and having integral means for insuring minimum clearance distance between an exterior surface of said unit and said framing members, said unit comprising, in combination:
(a) a fireplace unit having an outer shell of sheet metal defining the exterior surface thereof; and
(b) a rigid, plate-like spacer member having a straight edge portion and associated with said outer shell for movement with respect thereto about an axis substantially in the plane of said shell between a folded position, wherein no portion of said spacer member extends an appreciable distance beyond said external surface, and an erected position, wherein said edge portion is arranged at a distance from said external surface at least equal to said minimum clearance distance.

4,076,011

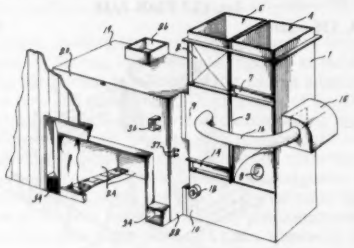
WARM AIR HEATING AND FIRE-PLACE SYSTEM

Roger Proulx, 383 Laurier Street, Otterburn Park, Rouville, Canada

Filed Jun. 21, 1976, Ser. No. 697,955
Int. Cl.[2] F24B *7/02*
U.S. Cl. 126—121 4 Claims

1. A warm air heating and fire-place system comprising, in combination, an open hearth jacketed fire-place opened at the front and including an outer casing and an inner wood-burning chamber separated from the outer casing by an air heating space, a bonnet upstanding from, and in communication with, the top of said chamber at its lower end, extending through said heating space and adapted to communicate with a smoke stack at its upper end, said outer casing having a side wall provided with a lower air inlet and an upper air outlet, and an auxiliary air heating assembly comprising an air plenum housing disposed adjacent said side wall of said outer casing and having a lateral outlet communicating with said lower air inlet

of said outer casing, first and second upright air conduits disposed side by side on top of said air plenum housing and having lower ends in direct communication with said air plenum housing, said second upright air conduit being disposed adjacent said side wall of said housing and said first upright conduit being disposed in the opposite side of said second upright air conduit with respect to said outer casing, said outer casing, air plenum housing and first and second upright air conduits being in general alignment, said first and second upright air conduits having top ends adapted to be connected to the return air conduit network and the warm air conduit network, respectively of a house to be heated, said second upright air conduit having a lateral opening spaced upwardly from the lateral opening of said air plenum housing and in direct communication with said upper air outlet of said outer casing, a motor-operated air blower located within said first upright air conduit to circulate air downwardly within said first upright air conduit from its top ends towards said air plenum housing and from said air plenum housing either through said air heating space within said outer casing and then to issue through the



open top end of said second upright air conduit or directly from said air plenum housing through said second upright air conduit to its open top end, an electric heating element mounted within the assembly of said first and second upright air conduits and said air plenum housing, downstream from said air blower, and valve means mounted within said assembly and operable to take a first limit position in which said valve means block air circulation through said air heating space within said outer casing, while they allow direct air circulation frm said air plenum housing upwardly through said second upright air conduit and a second limit position in which said valve means block air circulation from said air plenum housing through said second upright air conduit, while they allow air circulation from said air plenum housing through said air heating space of said outer casing and back into said second upright air conduit through said upper air outlet of said outer casing, so arranged that, when said electric heating element is operating, air heated thereby can flow directly from said first to said second upright air conduit without circulating through said outer space where the heated air would lose heat in heat exchange with said inner chamber.

4,076,012

FIREPLACE GRATE

John G. Meeker, Deansbridge Road, Somers, N.Y. 10589

Filed Oct. 30, 1975, Ser. No. 627,184

Int. Cl.[2] F23H *13/00*

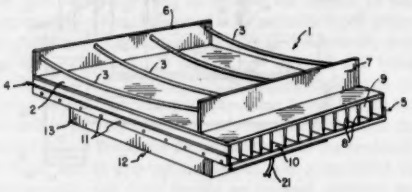
U.S. Cl. 126—164 **21 Claims**

1. A fireplace grate for holding logs in a fireplace located in a room of a building and having a back adapted to be disposed along the back of the fireplace and a front adapted to face the front of the fireplace, said grate comprising:

a. support means for supporting burning logs and accompanying ashes and hot embers and for transferring heat to air passageway means disposed therebelow, said support means having a lateral extent about the same as the length of logs to be supported and comprising a support plate for supporting said ashes and hot embers;

b. a plurality of spaced heat transfer fins depending from said support plate into said air passageway means, said fins extending from the back of said grate to the front of said grate to define separate air subpassageways;

c. air passageway means bounded at the top by said support plate, bounded on the bottom by a second plate generally co-extensive with said support plate, and having air inlet means connected thereto at the back of said grate and having air outlet means near the front of said grate extending across substantially the entire lateral extent of said support means;



d. fan means for forcing air into said air inlet means, through said air passageway means and out said air outlet means into said room; and

e. base means disposed beneath said air passageway means for supporting said grate in said fireplace with said air passageway means spaced above the floor of said fireplace.

4,076,013

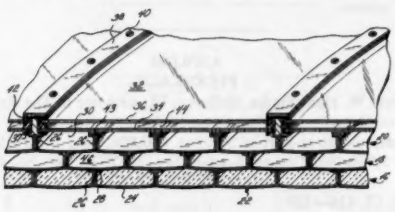
SOLAR HEATING SYSTEM

Joseph A. Bette, Southbury, Conn., assignor to Universal Construction Industries, Inc., Southbury, Conn.

Filed Mar. 11, 1976, Ser. No. 666,010

Int. Cl.[2] F24J *3/02;* **E04C** *1/00;* **F24H** *7/00*

U.S. Cl. 126—270 **9 Claims**



1. A solar heating system for use in a building comprising a self supporting stressed skin roof structure including three layers of longitudinally extended channel shaped beam members wherein each beam member is generally U-shaped in cross-section having a bight portion, outstanding leg portions, and an open channel between said leg portions directed outwardly of the interior of the building; said beam members in each layer being positioned side by side with each other and with their bight portions lying in substantially the same plane; the beam members in the two outermost layers being positioned on the free edges of the leg portions of the beam members in the underlying layer with their bight portions secured to said leg portions therebelow thereby to close the channels of the beam members in the intermediate and lowermost layers; means secured to the free ends of the leg portions of the beam members in the outermost layer for closing the open channels therein in an air tight relation; said means including at least one sheet of a generally transparent material; said channels in said outermost layer having a heat absorbing surface whereby said outermost layer of channels forms a solar heat collector collecting heat from the sun through said transparent material; insulating means in the channels of said lowermost layer for

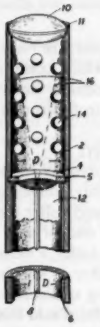
insulating the channels of the intermediate layer against heat loss to the interior of the building; a heat storage bed associated with said building; and means for selectively circulating air through the closed channels of said intermediate layer, through the heat storage bed and back to the channels of the intermediate layer, whereby air flowing in the channels of said intermediate layer below said outermost layer of channels absorbs heat collected from the sun in said outermost layer to in turn heat the heat storage bed to store heat therein; and separate means for selectively circulating air from the interior of said building to said heat storage bed and back to the building to draw heat from the storage bed and supply it to the interior of the building.

4,076,014

SOLAR CIGARETTE LIGHTER

Attilio-William Wiquel, c/o Monaco Government Tourist Office, 115 E. 64th St., New York, N.Y. 10021

Filed Aug. 12, 1976, Ser. No. 713,797
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—270 **4 Claims**



1. A cigarette lighter comprising a hollow tube, apertured means intermediate the ends of the tube to prevent a cigarette introduced into the tube at one end thereof from passing through the tube beyond said means, a lens of positive power arranged on the tube on the side of said means remote from said one end and spaced substantially by its own focal length from said means, and a plurality of axially extending ribs projecting inwardly from the inside wall of the tube in the portion thereof between said means and said one end of the tube, to center and guide a cigarette.

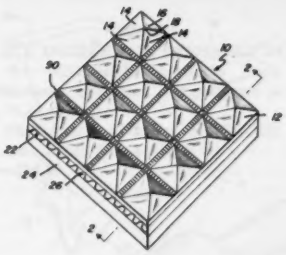
4,076,015

SOLAR ENERGY COLLECTOR

John P. Mattson, 123 Lake Shore Drive, Duxbury, Mass. 02332

Continuation-in-part of Ser. No. 621,759, Oct. 14, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 649,033
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **5 Claims**

1. An apparatus for collecting radiant solar energy upon an energy receiving means for conversion to heat energy comprising a solar energy collecting module, said module having a base and a plurality of radiant energy transparent means angularly disposed to said base for transmitting radiant energy to said energy receiving means for conversion to heat energy, and a plurality of reflective means angularly disposed to said base and adjacent said transparent means to reflect incident radiant energy to an adjacent transparent surface for transmission to said energy receiving means, said transparent and reflective surfaces forming a plurality of discrete structures having a



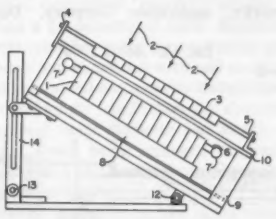
common base and at least one reflective surface, and means for transfer of said heat energy to a heat exchange fluid.

4,076,016

APPARATUS FOR THE UTILIZATION OF SOLAR HEAT

Maurice E. Phillips, 182 Dellenberger Ave., Akron, Ohio 44312

Filed Oct. 14, 1975, Ser. No. 622,149
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **7 Claims**



1. Apparatus for the utilization of solar heat comprising,
a carrying frame,
a plurality of hexagonal shaped solar collector cells carried by the frame having an open end directed toward incoming sunlight and a closed end, the cells on the closed end being of a high heat transfer metallic material,
a pair of spaced, substantially parallel header pipes on opposite sides and inside of the frame,
a plurality of substantially parallel heat transfer collector pipes connected at opposite ends to the header pipes and passing through the upper, center portion of each cell to obtain maximum focused heat, and
means to pass fluid through the header pipes and the heat transfer collector pipes to collect the heat passed by conduction, radiation, and convection to the fluid through the heat transfer pipe.

4,076,017

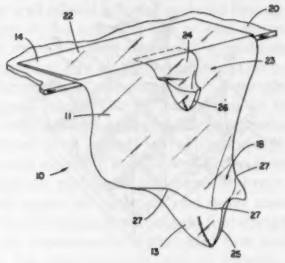
POSTPARTUM FLUID LOSS RECEPTACLE

John N. Haswell, 607 Dubois St., Vincennes, Ind. 47591

Filed Feb. 11, 1976, Ser. No. 657,161
Int. Cl.[2] A61B *10/00, 19/06*
U.S. Cl. 128—2 F **3 Claims**

1. A postpartum fluid loss receptacle which comprises:
a first sheet of flexible material that is essentially nonabsorbent to body fluids, said first sheet having a first end portion forming a first pocket and a second end portion, the first end portion of said first sheet being folded and defining a first edge and a second edge, the edges having a common point, the first edge being sealingly attached to

the second edge continuously along a line extending from the common point; and

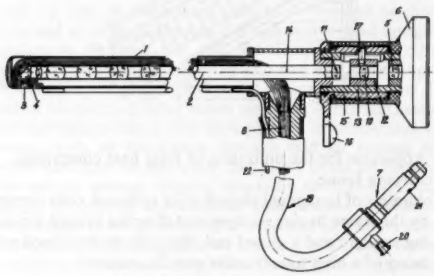


a second pocket smaller than the first pocket, said second pocket being connected to and position relative said first sheet of flexible material between the first and second end portions.

4,076,018
ENDOSCOPES

Helmut Heckele, Knittlingen, Germany, assignor to Richard Wolf GmbH, Knittlingen, Germany

Filed Dec. 1, 1975, Ser. No. 636,802
Claims priority, application Germany, Dec. 6, 1974, 7440701[U]
Int. Cl.² A61B *1/06*
U.S. Cl. 128—6 **3 Claims**



1. An endoscope comprising
a. a barrel
b. a light guide passing through said barrel
c. an optical system for viewing an illuminated area to be examined, said optical system having a focus,
d. a magnifying lens incorporated in said optical system and
e. means for selectively varying the magnification of the object to be viewed, thereby to enable the object to be viewed at one enlargement and view angle on the one hand and a different enlargement and view angle on the other hand, said means comprising a setting mechanism coupled to said magnifying lens for effecting axial displacement of said magnifying lens between two positions in which said magnifying lens lies in front of and behind said focus respectively.

4,076,019
ORTHOPEDIC CAST CONSTRUCTION

Bernard S. Sain, 811 Threadneedle Lane No. 285, Houston, Tex. 77079

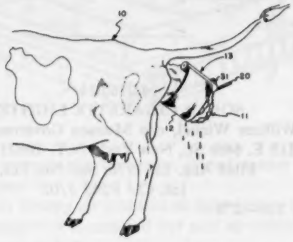
Filed Aug. 16, 1976, Ser. No. 714,701
Int. Cl.² A61F *5/04*
U.S. Cl. 128—83 **9 Claims**

5. A method of forming a cast on a patient comprising the step of placing moistened plaster bandages on a patient to form a cast, which cures on the patient after the passage of time, and including the step of positioning on the interior of said cast a fibrous material having impregnated therein a water adsorbing agent of silica-gel or alumina prior to curing of the cast.

4,076,020
VETERINARY APPLIANCE

James S. Lovick, Rte. 2, Box 76-B, Henderson, Tex. 75652

Filed Dec. 6, 1976, Ser. No. 748,067
Int. Cl.² A61F *5/24*
U.S. Cl. 128—98 **7 Claims**

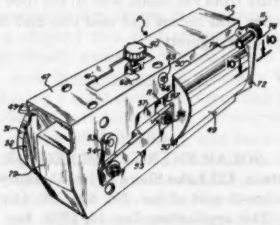


1. An apparatus for the size reduction of an edematous prolapsed bovine cervix which comprises:
(a) a flexible band member having a first end and a second end and adapted to fit around said edematous prolapsed bovine cervix;
(b) a housing member;
(c) a roller means rotatably supported by said housing;
(d) means for operably connecting at least one end of said band member to said roller means;
(e) when only one end of said band member is operably connected to said roller, a means for affixing the other end of said band member to said housing; and
(f) means for rotating said roller means to thereby decrease the effective length of said band member.

4,076,021
POSITIVE PRESSURE RESPIRATORY APPARATUS

Harris A. Thompson, 175 Bellevue Drive, Boulder, Colo. 80302

Filed Jul. 28, 1976, Ser. No. 709,450
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.6 **5 Claims**



1. A positive pressure respiratory apparatus to cyclically pump proper volumes of air for inspiration by a patient, as through a breathing tube extended to the patient, and comprising in combination therewith:
a. a frame, in the general form of an elongated rectangular tube, with portions of said walls having a top wall, a bottom wall and side walls cut away to provide operative clearances and to carry the components of said apparatus as a compact unit and facilitate the implacement and removal of the components to and from a container said

rectangular tube having a slot in each side wall adjacent one end of said frame and directly opposing each other;

b. a breathing tube; a cylinder having an outside diameter greater than the height of said slots and the width of said top and bottom walls and less than the height of said side walls, said cylinder being mounted within said slots and supported in said frame by said side walls, said cylinder having a closed end adjacent to one end of the frame and an open end within the frame, said breathing tube connected to and extending from the closed end and with the cylinder volume exceeding, but not greatly exceeding, the aforesaid proper volume of air for inspiration by a patient;

c. a piston within the cylinder;

d. a motor means mounted within the frame near the other end of the frame to rotate at a rate corresponding with the patient's natural or selected inspiration and exhalation breathing cycles, a crank having a first end mounted to said motor means for rotation thereof and a second end;

e. a rocker near the open end of the cylinder and having a first end pivotally mounted to the frame adjacent a sidewall of the cylinder to extend generally transversely to the cylinder and a second end and to rock towards and away from the cylinder;

f. a connecting arm having a second end pivotally mounted to the second end of said crank and a second end pivotally mounted to the second end of said crank and the rocker to swing the rocker towards and away from the cylinder as the crank rotates;

g. a piston rod pivotally connected to the rocker between said first and second ends thereof and to the piston to convert swinging movements at the rocker to sliding movements at the piston; and

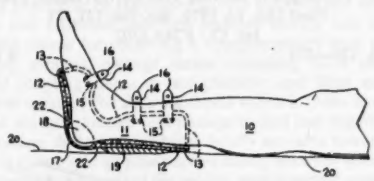
h. a valving means associated with the cylinder and the tube to permit air to flow into the cylinder when the piston is moving towards the open end of the cylinder and prevent a flow of air from the patient's end of the tube towards the cylinder, and to confine air flow to the tube and to the patient when the piston is moving towards the closed end of the cylinder.

4,076,022

THERAPEUTIC FOOT AND LEG PROTECTOR

James Walker, 6 Pine Tree Drive, Stamford, Conn. 06906

Filed Dec. 20, 1976, Ser. No. 752,529
Int. Cl.[2] A61B *19/00*
U.S. Cl. 128—149 **10 Claims**



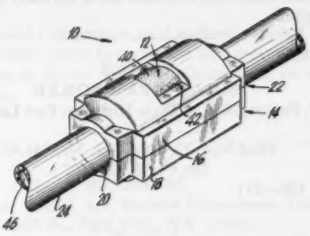
1. A therapeutic foot and leg protector comprising a rigid shell and a soft protective batting disposed within said shell, said shell and said batting partially encasing and generally conforming about a lower portion of a leg and a foot of a patient disposed therein, means defining a cut-away heel portion in said batting, said shell having a perforated heel portion substantially surrounding the heel of said patient adjacent said cut-away heel portion of said batting for the purpose of aerating a sore disposed on the heel of said patient, said shell further comprising a built-up supporting section generally extending from said heel portion along a portion of the shell encasing the lower leg portion of the patient, said supporting section raising a level of said heel portion of said shell generally above a level of a bed in which the leg and shell are resting and extended, said supporting section allowing a facilitated circulation of air about the heel of said patient via the perforated heel portion of the shell, while the leg of the patient is resting and extended upon the bed, whereby a healing of said heel sore may be more aptly effected as a result of the facilitated circulation.

4,076,023

RESEALABLE DEVICE FOR REPEATED ACCESS TO CONDUIT LUMENS

Felix Jesus Martinez, Demarest, N.J., assignor to Erika, Inc., Rockleigh, N.J.

Filed Aug. 1, 1975, Ser. No. 600,980
Int. Cl.[2] A61M *5/00*
U.S. Cl. 128—214 R **6 Claims**



1. A resealable device for repeated access to the lumen of a continuous walled conduit, comprising:

a puncturable, elastomeric, generally tubular shaped member having a predetermined outer diameter and length, said tubular member being concentrically arranged about said conduit and in contact with said conduit; and

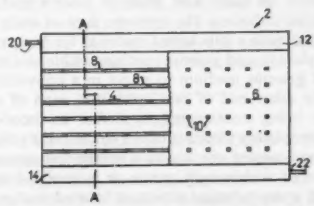
rigid jacket means defining a cavity therein having a smaller diameter and longer length than said elastomeric member predetermined outer diameter and length, respectively, said jacket means being arranged concentrically about said conduit with said cavity about said elastomeric member, whereby said elastomeric member is radially compressed against said conduit, said jacket means defining an opening into said cavity to expose a portion of said elastomeric member for access by needles and cannulae and including fixed transverse stop means at each end of said cavity for limiting the longitudinal expansion of said elastomeric member to concentrate and maintain the elastic recoil energy of said elastomeric member against the conduit enabling said elastomeric member to reseal punctures therein and also provide a compression seal between said elastomeric member and the conduit, thereby preventing leakage from the conduit lumen after access thereto.

4,076,024

SOLAR RADIATION COLLECTOR

Joseph Banet, 112 Uziel Str., Jerusalem, Israel

Filed Mar. 16, 1976, Ser. No. 667,430
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **8 Claims**



1. A solar radiation collector comprising a first and a second plate member in close spatial disposition and seamed along

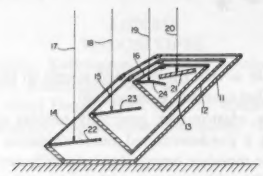
their edges to define a closed liquid containing substantially planar chamber therebetween, said chamber having an inlet and an outlet port and wherein said first plate member is provided with substantially parallel extending shallow channels projecting toward the interior of said chamber, said second plate member is provided with a plurality of shallow recesses projecting toward the interior of said chamber and wherein web portions of said channels and recesses engage each other whereby there are formed longitudinal passages along the inner surface of said first plate and longitudinal and transverse passages along the inner surface of said second plate to enable the liquid to be heated by solar energy, to flow in a longitudinal direction along the inner surface of said first plate and in a longitudinal transverse direction along the inner surface of said second plate.

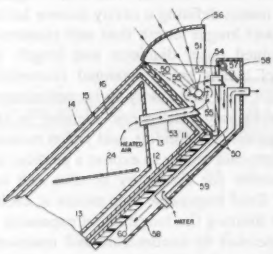
4,076,025

SOLAR STEAM BOILER

Louis W. Parker, 2040 N. Dixie Highway, Fort Lauderdale, Fla. 33305

Filed Nov. 22, 1976, Ser. No. 744,054
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **6 Claims**





1. A solar heater comprising a plurality of elongated containers nested one within the other, each of said containers having a gaseous medium therein, said containers respectively heaving transparent upper surfaces which are superposed and positioned to admit incident solar radiation to the interior of each of said containers, the other surfaces of each container being coated with a heat insulating material superposed by a heat reflective material for reflecting heat toward the interior of said container, at least one heat absorbing and radiating plate located within each of said containers adjacent one end of said container, each of said plates having a face which is exposed to said incident solar radiation and which is coated with a blackened material to cause said plate to absorb heat from said incident solar radiation, the opposite face of each such plate being coated with a blackened material for transmitting heat from said plate to said gaseous medium within said container to cause said gaseous medium to move in a convection current toward the other end of said container, each of said nested containers being constructed to define an interior volume which is completely closed off from the interior volumes of the others of said nested containers whereby the convection current produced within each container is confined to that container, and a steam boiler structure located within the innermost one of said nested containers, said boiler structure being positioned within said innermost container to be heated by solar radiation incident on said boiler structure through said superposed transparent surfaces, the exterior side of said boiler structure which is exposed to said incident solar radiation being coated with a blackened heat absorption material, and the opposite exterior side of said boiler structure being polished to a shine to reduce heat radiation from said boiler.

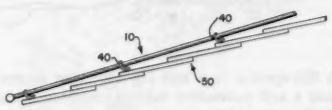
4. A solar heater comprising a plurality of elongated containers nested one within the other, each of said containers having a gaseous medium therein, said containers respectively having transparent upper surfaces which are superposed and positioned to admit solar radiation to the interior of each of said containers, the other surfaces of each container being coated with a heat insulating material superposed by a heat reflective material for reflecting heat toward the interior of said container, at least one heat radiating plate located within each of said containers adjacent one end of said container, each of said plates having a face which is exposed to incident solar radiation and which is coated with a blackened material to cause said plate to be heated by said incident solar radiation, the opposite face of each such plate being coated with a blackened material for transmitting heat to said gaseous medium within said container to cause said gaseous medium to move in a convection current toward the other end of said container, a steam boiler structure located within the innermost one of said containers, said boiler structure being positioned within said innermost container to be heated by solar radiation incident on said boiler structure through said superposed transparent surfaces, the exterior side of said boiler structure which is exposed to incident solar radiation being coated with a blackened heat absorption material, and the opposite exterior side of said boiler structure being polished to a shine to reduce heat radiation from said boiler, a steam outlet pipe connected to said boiler structure, said steam outlet pipe being located within a further container located adjacent one end of said plurality of nested containers, said further container having a further transparent upper surface to admit solar radiation to said further container, the side of said steam outlet pipe which faces said further transparent upper surface being coated with a blackened heat absorption material and the opposite side of said steam outlet pipe being polished to a shine, an optical means for focusing solar radiation on said outlet pipe to further heat steam passing thrrough said outlet pipe, said optical means comprising a cylindrical lens, and means for varying the position of said lens to concentrate solar energy on said pipe.

4,076,026

SOLAR HEATER

Bruce G. Copping, 310 Burning Tree Drive, Naples, Fla. 33940

Filed Oct. 12, 1976, Ser. No. 731,221
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—271 **4 Claims**



1. A solar heater for a liquid and comprising a panel unit including a plurality of tubes lying in and defining a plane, said panel unit comprising an inlet header tube, an outlet header tube, a coupling securing said inlet and outlet header tubes together and in alignment, seal means associated with said coupling to prevent direct flow from said inlet header to said outlet header, a connector header, one set of a plurality of relatively small diameter tubes connecting said inlet header to

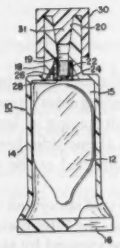
spaced areas of one end portion of said connector header, a second set of a plurality of relatively small diameter tubes connecting spaced areas of the other end portion of said connector header to said outlet header tube; and support means for said panel unit comprising members slidably engaging said sets of tubes, said members comprising flexible anchor strips extending the width of said panel and apertured to engage all of said tubes of said sets of tubes, a portion of said strip extending down from said tubes to be anchored to a support structure by anchor means, inlet and outlet tubes connected to said inlet and outlet headers to retain such tubes and headers in substantially fixed positions and permit longitudinal movement of said tubes of said sets of tubes and of said connector header in relation to said anchor strips to said inlet and outlet tubes.

4,076,027

FLUID TRANSFER DEVICE

Elmer A. Koenig, Kirkwood, Mo., assignor to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed May 7, 1976, Ser. No. 684,139
Int. Cl.² A61J 1/08
U.S. Cl. 128—272 **12 Claims**



1. In combination, a container, and at least a portion of a glass ampule containing a parenteral liquid, said container comprising first and second relatively rigid members connected together to define a chamber shaped to receive said ampule portion, said ampule portion being disposed in said chamber, coupling means on each of said members engageable with each other to connect said members together and permit relative axial movement of said members while connected together and permit separation of said members to permit said ampule portion to be positioned axially between said members within said chamber, said first member having luer tapered coupling means for receiving a complementary luer tapered coupling element, passage means extending from said luer tapered coupling means to said chamber, and filter means in said first member for filtering liquid when it flows from said ampule portion through said passage to said luer tapered coupling means, said members being axially movable toward each other to clamp said ampule portion axially between portions of said members, and means for sealing said chamber against the flow of liquid from said ampule to the exterior of said container.

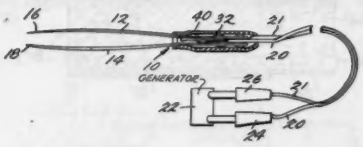
4,076,028

FORCEPS SPACING DEVICE

Raymond W. Simmons, Pinellas Park, Fla., assignor to Concept Inc., Clearwater, Fla.

Filed Oct. 7, 1976, Ser. No. 730,613
Int. Cl.² A61B 17/36; A61N 3/06
U.S. Cl. 128—303.13 **12 Claims**

1. An electrosurgical forceps comprising two electrically conductive blades each blade having a forward end and a rear end, an electrosurgical frequency carrying insulated wire means for connecting only said forceps blades to an electrosurgical frequency generator, said wire means being secured to said forceps blades and adapted to be connected to said generator, a spacer means constructed of insulative material secured between the rear ends of said blades, said spacer means comprising a front section and a rear section, both sections conforming to the shape of the forceps blades and a middle section defining two inclined serrated surfaces extending between the



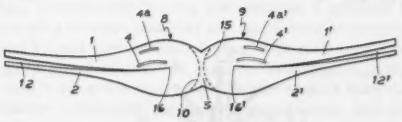
front section and rear section, said inclined serrated surfaces engaging said wire means to secure the wire means against said forceps blades in direct electrical contact with each of the forceps blades.

4,076,029

BRASSIERE

Attilio-William Wiquel, c/o Monaco Government Tourist Office, 115 E. 64th St., New York, N.Y. 10021

Continuation-in-part of Ser. No. 713,798, Aug. 12, 1976. This application Mar. 29, 1977, Ser. No. 782,534
Int. Cl.² A41C 3/00
U.S. Cl. 128—425 **9 Claims**



1. A brassiere comprising, for each of two breast-receiving cups, an elongate strip of flexible material slit from one end to a location near the other end to form two connected limbs, the limbs being crossed over each other to form a concave breast-receiving cup, and means to hold said limbs in crossed position, the brassiere further comprising means joining said strips together.

4,076,030

METHOD FOR UTILIZING TOBACCO STEMS IN SMOKING PRODUCTS

Ezra Thomas Smith, Kernersville, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Dec. 22, 1975, Ser. No. 643,207
Int. Cl.² A24B 3/18
U.S. Cl. 131—17 R **9 Claims**

1. The process of treating tobacco stems that have not been previously rolled or crushed which comprises conditioning the stems to a moisture content between 18 and 50 percent, subjecting the conditioned stems to a cutting operation in which the cuts per inch are at least 25, expanding the cut stems and subjecting the expanded cut stems to a second cutting operation to produce particle sizes approximating those found in cut tobacco filler for cigarettes or cut pipe tobacco.

4,076,031

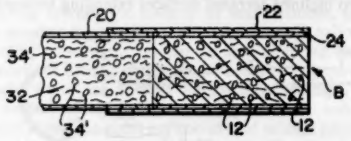
FILTER AND CIGARETTE INCLUDING A FILTER

Harold Grossman, Upper Montclair, N.J., assignor to Montclair Research Corporation, Silver Spring, Md.

Continuation of Ser. No. 562,214, March 26, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,668
Int. Cl.² A24B 15/02
U.S. Cl. 131—261 A **8 Claims**

1. A filter for tobacco smoke comprising a porous substrate

having a deposit thereon of a system of particles of a water-insoluble, hydrophobic, moisture-laden substance activatable



by the tobacco smoke to release the moisture, the major ingredient of the substance being water.

4,076,032

VENTED HAIR BRUSH

Douglas Misercola, Mamaroneck, N.Y., assignor to Empire Brushes, Inc., Port Chester, N.Y.

Filed Aug. 17, 1976, Ser. No. 715,187

The portion of the term of this patent subsequent to Dec. 21, 1990, has been disclaimed.

Int. Cl.² A45D *20/00*

U.S. Cl. 132—9 **22 Claims**

1. A hair brush intended to be used with a distinct and separate air blower which can be selectively moved relative to said hair brush, said hair brush comprising a body having an elongated handle, said handle having a first end and a second end, said ends being spaced apart from each other, an elongated tubular brush block affixed to said first end of said handle, said brush block being substantially in tandem with and coaxial of said handle so that said handle and said brush block may be rotated together about the elongated longitudinal axis of said handle and said brush block, said brush block being formed with an interior bore extending lengthwise of said brush block, said interior bore being coaxial with the longitudinal axis of said handle, said brush block being provided with inwardly directed web means defining a plurality of longitudinally and circumferentially spaced diametric elongated crossing through passages communicating at said bore arranged in transverse sets of passages to direct air initially toward said bore from a separate air blower from where the air can pass through said passages to be directed against a user's hair for the styling of said hair, each of said passages being in communication with said bore to allow air to be blown through said passages by the separate air blower toward one side of the brush block when juxtaposed adjacent said side thereof, a plurality of hair brush elements affixed to said brush block and projecting outwardly therefrom in longitudinally and circumferentially spaced relation and disposed between said sets of passages, said handle having means to close said handle to prevent air from being blown through said passages and said bore entirely through the handle of the brush block or through said handle to said bore and passages of said brush block.

4,076,033

SPRAYING APPARATUS FOR CLEANING FILTER PRESS PLATES

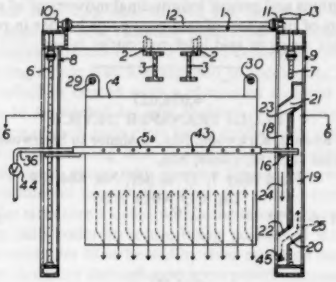
Oswald Busse, and Hugo Klesper, both of Aarbergen, Germany, assignors to Passavant-Werke Michelbacher Hutte, Germany

Filed Jun. 30, 1976, Ser. No. 701,081

Claims priority, application Germany, Jul. 3, 1975, 7521093[U]

Int. Cl.² B08B *3/02*

U.S. Cl. 134—172 **13 Claims**



1. Spraying apparatus for cleaning filter press plates which are slidable along horizontal guides therefor comprising,

a. at least one spray unit having at least one tube with one row of spray nozzles at one side thereof located at spaced apart locations and directed at the vertical surface of an adjacent filter plate,

b. means to reciprocate said spray unit over a distance equalling the distance across the filter plate to be cleaned so that spaced apart areas are sprayed by said one row of nozzles as said spray unit makes one run relative to said filter plate to be cleaned,

c. spray nozzles positioned at the other side of said spray unit during the return run thereof between said spaced apart locations of said one row of nozzles in position to spray the areas between said spaced apart areas on the return run of said spray unit with the spray nozzles at said other side of said spray unit being staggered in a direction longitudinally of said tube relative to the spray nozzles of said one row of spray nozzles a distance of approximately half the spacing between the spray nozzles of said one row of spray nozzles,

d. means to rotate said spray tube approximately 180° about its longitudinal axis adjacent at least one point that reverse movement takes place in the reciprocation of said spray unit, and

e. means supplying fluid under pressure to said one row of spray nozzles as said spray unit makes said one run and to said spray nozzles located between said spaced apart locations as said spray unit makes said return run.

4,076,034

METHOD FOR SEALING A BUTTERFLY VALVE

Horst Adams, Bochum, Germany, assignor to Panamera, A.G., Switzerland

Division of Ser. No. 611,764, Sept. 9, 1975, Pat. No. 4,003,394. This application Sep. 24, 1976, Ser. No. 726,335

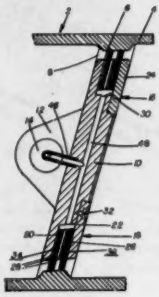
Claims priority, application Germany, Sep. 12, 1974, 2443723; Jul. 23, 1975, 2532879

Int. Cl.² F16K *1/22, 25/00*

U.S. Cl. 137—15 **3 Claims**

1. A method for sealing a high pressure butterfly valve, the valve having a tubular housing including a valve seat, a disc pivotally mounted within the housing for movement between an open position in which the disc is substantially parallel to an axis through the housing and a closed position in which it is

parallel to the valve seat, the disc including a peripheral seal ring disposed in a peripheral seal ring groove of the disc for engaging the valve seat when the disc is closed and a conduit communicating a source of a pressurized fluid with the ring groove, the method comprising the steps of moving the disc from its open position towards its closed position; flowing a pressurized fluid from the source through the conduit into the seal ring groove; flowing the pressurized fluid from the seal



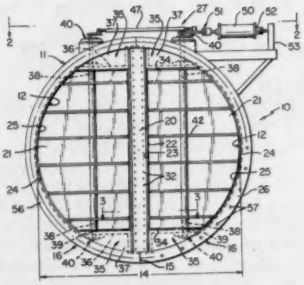
ring groove to a periphery of the seal ring by directing the fluid in a generally radial direction along a portion of the seal ring disposed between axial ends of the seal ring while continuing the step of moving the disc, whereby pressurized fluid contacts the seat before the seat is contacted by the seal ring to thereby remove foreign particles from the seat, and continuing the step of moving the disc until the seal ring fully engages the seat and seals an upstream portion of the valve from a downstream portion thereof.

4,076,035

VALVE CONSTRUCTION

Paul P. Frisch, Skokie, Ill., assignor to Dayco Corporation, Dayton, Ohio

Filed Dec. 20, 1976, Ser. No. 752,486
Int. Cl.² F16K 1/22
U.S. Cl. 137—601 **8 Claims**



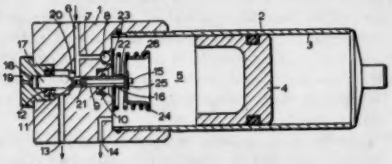
1. A butterfly valve construction comprising, a valve body comprised of two roughly semicylindrical portions having open ends, means comprising a box-like assembly connecting said open ends to define said valve body as a pair of back-to-back roughly D-shaped portions, a pair of valve members each rotatably mounted within an associated D-shaped portion, a pair of barrier structures at opposite ends of each D-shaped portion adjoining said bar-like assembly, and means for rotating said valve members to open and close same.

4,076,036

HYDRAULIC FLOW CONTROL VALVE ASSEMBLIES

Philip Augustus Taft, Solihull, England, assignor to Girling Limited, Birmingham, England

Filed Apr. 24, 1974, Ser. No. 463,612
Claims priority, application United Kingdom, Apr. 24, 1973, 19461/73
Int. Cl.² G05D 11/00
U.S. Cl. 137—118 **9 Claims**



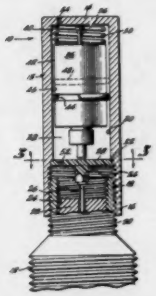
1. A control valve assembly for use in vehicle hydraulic systems, said assembly comprising a housing which includes an inlet passage for connection to a pump, a first outlet passage for connection to an hydraulic accumulator and a braking circuit, a non-return valve between said inlet passage and said first outlet passage, a second outlet passage for connection to a steering circuit, a bleed passage connecting said inlet passage with said second outlet passage, and a second valve responsive to the pressure in said first outlet passage for controlling communication between said inlet passage and said second outlet passage, wherein said housing also includes a cylinder bore, and a seating between said bore and said second outlet passage, one end of said bore communicating with said second outlet passage, a piston of constant diameter in sealing engagement with said bore, and a stem of a diameter smaller than that of said piston connected to and extending from said piston towards said second outlet passage, said second valve comprising a valve member integral with said stem and engagable with said seating, and said inlet passage leads into said bore between said piston and said valve member.

4,076,037

SAFETY VALVE CAP FOR INFLATABLE BODIES

Jose R. Perez, 10828 SW. 3 St., Miami, Fla. 33174

Filed Feb. 27, 1976, Ser. No. 662,211
Int. Cl.² F16K 15/20
U.S. Cl. 137—230 **4 Claims**



1. A safety valve cap for engagement on the valve stem of an inflatable body to prevent increases of pressure therein above a pre-selected level,

the valve stem of said inflatable body being of the type provided with a check valve for pressurizing the inflatable body and for releasing the air pressure therefrom by means of a pressure release pin, said safety valve cap comprising:

A. a generally tubular wall having a first end and a second end and defining an interior chamber, an outer end closure wall having orifice means therethrough at said second end, and an open inner first end, said first end of said tubular wall having an internally threaded zone for removable threaded fixed engagement with an outwardly extending threaded end portion of the valve stem of the inflatable body;

B. a disc member, spanning said interior chamber, adjacent to and spaced from said first end, said disc member having an orifice therethrough and an outwardly extending depressor stud extending toward said second end, said second stud being normally in depressing engagement with the pressure release pin of the valve stem check valve when said tubular wall is in threaded engagement with said valve stem;

C. a check valve, slidably engaged in said interior chamber between the disc member and the first end closure wall, the outer cylindrical housing of said check valve comprising a piston;

D. O-ring means carried by said piston in sealing slidable engagement with the tubular wall in said interior chamber;

E. compression spring means captivated in said interior chamber between said second end closure wall and said piston;

F. said check valve including a release pin in said piston and said pin having a portion extending from said piston toward but not to said outer end closure wall of said second end and adapted upon axial movement of said check valve to open said check valve; and

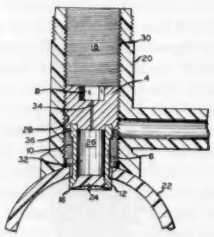
G. said compression spring being calibrated to a predetermined degree of compression to correspond to the air pressure to be maintained in the inflatable body and yieldable upon an increase in pressure to permit escape of pressure through the safety valve cap orifice means in the event of a pressure in the inflatable above the predetermined level.

4,076,038

TAPPING TEE CUTTER HAVING RELIEVED SIDEWALL

Ralph A. Wynne, Dallas, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 5, 1976, Ser. No. 646,469
Int. Cl.² B23B *41/08*
U.S. Cl. 137—318 **11 Claims**



1. A cutter for a tapping tee for cutting plastic pipe comprising:

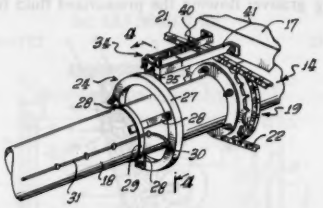
a. a band cutter terminating in a cutting edge, said cutter having a portion of the cutter wall near the cutting edge of an external diameter at least equal to the diameter of the cutting edge and forming a shoulder with an adjacent portion of the cutter wall, said adjacent portion of the cutter wall having a relieved external diameter sufficiently less than the diameter of the cutting edge to minimize the frictional contact between the relief diameter and the cut wall of a pipe being tapped.

4,076,039

SIGNAL TRANSMISSION AND CONTROL SYSTEM

Robert E. Hartsock, 2025 Deep Canyon Road, La Habra, Calif. 90631

Filed Jan. 14, 1976, Ser. No. 649,192
Int. Cl.² A01M *7/00*; B05B *3/00*
U.S. Cl. 137—344 **6 Claims**



4. In combination with a farmland irrigating apparatus having a frame; an engine, mounted on said frame for powering the movement of said apparatus; a set of driving wheels for permitting movement of said apparatus; and a rotatable hub adapted to fasten a central irrigating pipe thereto, said pipe being adapted to rotate about its longitudinal axis; the combination comprising:

a magnetic-field-producing multi-turn wire coil mounted on said rotatable pipe;

said coil being mounted to rotate with said pipe, and to produce a magnetic field that is substantially concentric with the axis of rotation of said pipe;

means for detecting the magnetic field produced by said coil regardless of the angular orientation of said coil, and regardless of whether said coil is rotating or is stationary;

said detector comprising a magnetic-reed-switch;

means for mounting said magnetic-reed-switch on said frame, and positioned in the magnetic area of said coil;

means, comprising a control box, for remotely energizing said coil;

whereby when said control box energizes said coil, the magnetic field from said coil causes said detector to produce a signal;

means for utilizing said signal from said detector.

4,076,040

ALTERNATOR VALVE

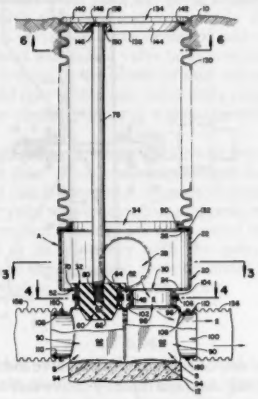
Robert J. Alpers; Fredrick J. Crates; Denis P. Ott, and John D. Schmunk, all of Findlay, Ohio, assignors to Hancor, Inc., Findlay, Ohio

Filed Jun. 1, 1976, Ser. No. 691,890
Int. Cl.² F16K *11/00*
U.S. Cl. 137—371 **16 Claims**

14. In a valve assembly adapted to be located some distance beneath a reference surface wherein said valve includes a housing having a valve plug receiving opening in the top wall thereof; an inlet and at least one outlet and wherein a valve plug member is receivable in said housing through said receiving opening in a fluid blocking position with said at least one outlet, said valve plug member including a sealing area adapted to sealingly engage a seat area disposed in said housing adjacent said at least one outlet and wherein an elongated member having one end operatively communicating with said valve plug to extend outwardly therefrom through said housing receiving opening toward said reference surface when said valve plug is received in said fluid blocking position with said at least one outlet, the improvement comprising:

said elongated member being dimensioned so that the other end thereof is disposed adjacent said reference surface; means for defining a passage extending between said housing receiving opening and reference surface, said passage defining means being dimensioned to receive at least said elongated member therethrough; and, means for selectively closing said passage defining means adjacent said

reference surface and including means for positively cooperating with said elongated member other end to assist in maintaining said valve plug sealing area in sealing engagement with the seat area of said at least one outlet and to prevent dislodgement of said valve plug from the desired fluid blocking position.



4,076,041

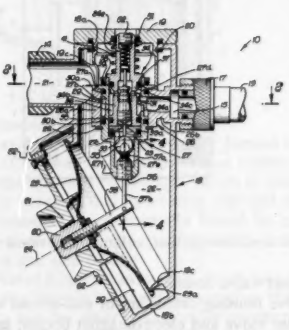
PILOT VALVE OPERATED DEMAND REGULATOR FOR A BREATHING APPARATUS

Raymond A. Christianson, 120 8th St., Manhattan Beach, Calif. 90266

Continuation-in-part of Ser. No. 508,580, Sept. 23, 1974, abandoned. This application Jun. 16, 1975, Ser. No. 587,272

Int. Cl.[2] F16K *31/126*

U.S. Cl. 137—490 **8 Claims**



1. A demand regulator for use with a breathing apparatus comprising:

a regulator body having an interior chamber, a mouthpiece outlet communicating from said interior chamber, a diaphragm responsive to pressure within said interior chamber, an inlet port, an annular support member within said interior chamber, and a tublar member communicating between said inlet port and said support member,

a generally cylindrical valve housing removably supported within said annular support member, said housing having an open end and a substantially closed end,

a poppet movably mounted within said valve housing, said inlet port communicating via said tubular member and an inlet opening in said valve housing to a space between said valve housing and said poppet, the flow of breathable gas from said inlet port to said interior chamber being controlled by a flow valve formed by said poppet and a portion of said housing, said poppet being biased to a position closing said flow valve, and

a normally closed pilot valve mounted within said poppet for movement therewith, and controlling the flow of gas from said space via a flow channel through said poppet to a position between an end of said poppet and said substantially closed end of said housing, the force of said gas admitted to said position being exerted directly on said poppet end to cause displacement of said poppet against said bias, thereby opening said flow valve, said pilot valve being linked to said diaphragm and being mounted so that said pilot valve is urged closed as said poppet is displaced in the flow valve opening direction.

4,076,042

CUT-OFF VALVE FOR OIL FIRING INSTALLATIONS

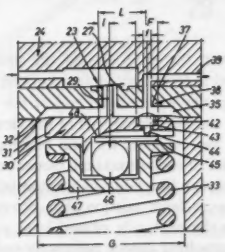
Peder Larsen, Augustenborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Continuation-in-part of Ser. No. 611,196, Sept. 8, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,475

Claims priority, application Germany, Dec. 10, 1973, 2361380

Int. Cl.[2] F16K *31/12*

U.S. Cl. 137—494 **1 Claim**



1. A cutoff valve unit for an oil burner assembly comprising a casing defining a chamber, inlet and outlet passages in said casing having communication with said chamber, said outlet passage having a valve seat, a movable adjustment element in said chamber having a disk shaped portion, spring means biasing said element in the direction of said valve seat, a diaphragm in said chamber between said disk shaped portion and said valve seat, a closure member having a face which engages said valve seat, said closure member being attached to said disk shaped member with said face being displaceable relative to said disk shaped member, said face having a larger diameter than said valve seat, said closure member extending through said disk shaped portion, a second element between said disk shaped portion and said spring means, said second element being movable relative to said adjustment element, a bearing between said elements, a lever having one side thereof engaging said bearing and the other side thereof engaging said adjusting element and said closure member at spaced apart points, said bearing being between said points.

4,076,043

HIGH FATIGUE STRENGTH CHECK VALVE

John Rogan, Greenford, England, assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Jul. 1, 1976, Ser. No. 701,923

Int. Cl.[2] F16K *15/04*

U.S. Cl. 137—539.5 **9 Claims**

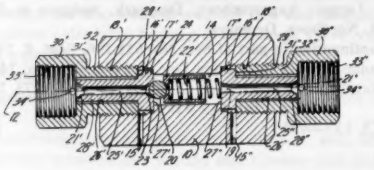
1. A ball-type valve assembly especially suited for service in high pressure fluid systems comprising

a. a main body block having a longitudinal opening extending therethrough the median portion of which is a smooth cylindrical bore having a smaller cross-section than any of the remaining portions of said longitudinal opening and a

portions of said longitudinal opening on either side of said media portion being in the form of a counter bored well of substantially larger cross-section then said median portion thus providing an annular shoulder adjacent either end of said smooth cylindrical bore,

b. a ball stop, associated biasing spring element and movable guide member slidably housed within said median portion to permit limited axial movement of said ball stop between closed and open positions,

c. an upstream and a downstream tail piece each having a fluid passageway extending therethrough along its longitudinal axis and an enlarged head portion fitting closely within the counter bored well on the respective side of said median portion, the face of each head portion being shaped to bear uniformly against a direct-contact sealing area on the annular shoulder adjacent thereto, the fluid



passageway at the head end of the upstream tail piece being shaped to form a valve seal for said ball stop and the fluid passageway at the head end of the downstream tail piece being shaped so that part of the face portion thereof serves as a base support for said biasing spring element, the remainder of each of said tail pieces being formed as an elongated, sleeve-like body of substantially smaller cross-section than its head portion thus providing an annular shoulder on the back side of said head portion, and

d. a back-up attaching device positively engagine with each end of said main body block and having a collet shaped extension thereon which fits around the sleeve-like body of the adjacent tail piece and bears upon the annular shoulder on the back side of said head portion so as to force the face thereof into good sealing contact with said sealing area on the annular shoulder adjacent thereto.

4,076,044

LOCK CHAMBER FOR DISCHARGING DUST

Josef Franz Schindling, Frankfurt-Unterliederbach, Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sep. 24, 1976, Ser. No. 726,487

Claims priority, application Germany, Sep. 30, 1975, 2543523

Int. Cl.[2] G01F *11/42*; F16K *5/00*

U.S. Cl. 137—614.11 **7 Claims**

1. A lock chamber device for discharging dust by gravity from a pressurized system, comprising:

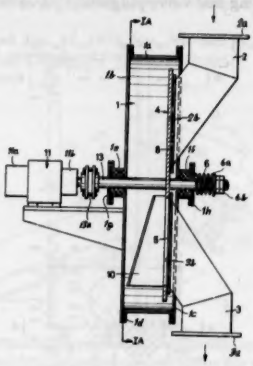
housing means forming a chamber;

an inlet opening communication with said system and having an opening into said chamber;

an outlet opening from said chamber at a location spaced from said inlet;

a rotary valve member disposed in said chamber and provided with a throughgoing passage selectively alignable with said inlet and outlet openings whereby only one of said openings can communicate with the interior of said chamber at any time; and

prestressed resilient means urging said valve member against said openings, said valve member consisting of a flat disk, said openings lying in a common vertical plane perpendic-



ular to the axis of rotation of said valve member said inlet opening being disposed directly above said outlet opening.

4,076,045

SOLENOID OPERATED VALVE

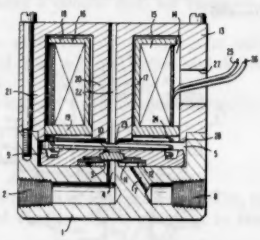
Hiroyuki Nakajima, Ashiya, Japan, and Takashi Hosokawa, No. 43, Nishimagawa-cho 6-chome, Higashisumiyoshi, Osaka, Japan, assignors to Konan Electric Co., Ltd., Nishinomiya and Takashi Hosokawa, Osaka, both of Japan

Continuation of Ser. No. 566,575, Apr. 8, 1975, abandoned. This application Jul. 30, 1976, Ser. No. 710,048

Claims priority, application Japan, Nov. 27, 1974, 49-144715

Int. Cl.[2] F16K *31/06*

U.S. Cl. 137—625.65 **2 Claims**



1. A low cost, low power, solenoid operated valve comprising:

a two part valve housing,

said valve housing consisting of end-to-end sealably joined annular valve and electromagnet bodies, said valve body being of U-shape in vertical cross-section and defining a central, circular valve chamber, said electromagnet body being of E-shape in cross-section and defining integral central and outer yokes forming an annular coil chamber,

means for sealably connecting said valve bodies together at their peripheries with said chambers facing each other and with the ends of said central yoke and that of said outer yoke extending to said valve chamber,

a cylindrical solenoid coil bobbin including integral, inner and outer flanges at opposite ends and carrying a coil wrapped about said cylindrical coil bobbin between said flanges, said bobbin being disposed within said coil chamber, the inner flange relative to said coil chamber having a radial width less than that of said coil chamber and at least a part of said outer flange having a radial width in excess of that of the coil chamber and being tightly fitted within said coil chamber to render said coil chamber fluid

tight to prevent the passage of fluid between said valve and coil chambers,

an annular movable valve block positioned within said valve chamber and having a diameter such that its periphery extends to said outer yoke and being located at the center of said valve chamber, said valve body being provided with a first valve seat at the center of said valve chamber,

a first fluid port within said valve body communicating to an aperture formed in the center of said valve seat,

a second fluid port within said valve body communicating to said valve chamber through a passage within said valve body,

a spring biasing said movable block away from said yokes to close said first valve seat aperture and being attracted, when said coil is energized, towards said central yoke and said outer yoke to provide a low magnetic impedance path through contact of said block at its center with the central yoke and at its periphery with the outer yoke and to readily open the valve seat aperture under low current to said coil against the bias of said spring.

4,076,046

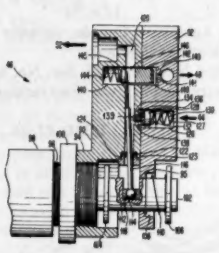
FAST ACTING TWO-WAY VALVE

Gerald Whitfield Hieronymus, Lexington; Michael Lynn Sendelweck, Georgetown; James Everett West, and Joe William Woods, both of Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 1, 1976, Ser. No. 691,648

Int. Cl.[2] F16K *11/16*

U.S. Cl. 137—627.5 **3 Claims**



1. A valve assembly comprising:

a housing having a small volume cavity formed therein for communicating with two valves and an outlet;

a valve member in each of said two valves to control communication between said two valves and said cavity;

said valve members being normally biased by means in a closed position to prevent communication between said two valves and said cavity;

one of said valve members extending across said cavity and having a slot therein substantially equal to the width of said cavity and the other of said valve members having a portion thereof extending into said cavity;

actuating means extending through said cavity and passing adjacent said portion and extending into said slot for actuating said two valve members;

sealing means within said housing surrounding said actuating means to seal said cavity to the atmosphere;

solenoid means connected to said actuating means for providing pivoting motion to said actuating means;

said solenoid means normally conditioning said actuating means to hold one or the other of said valve members in an open condition;

said solenoid means when in a deactivated state holds said actuating means against a sidewall of said slot in said one valve member to maintain the corresponding one of said valves in an open position and thereby establish a fluidic path through said one valve, said cavity and said outlet, with said other valve being in a closed position;

said solenoid means upon activation pivoting said actuating means away from said sidewall in said slot allowing said one valve member to close completely and thereby break said fluidic path through said one valve, said cavity and said outlet;

after said one valve is closed completely, said actuating means continuing its pivoting motion through said cavity contacts said other valve member to force said other valve member in the other of said valves to an open position to thereby make a fluidic path through said other valve, said cavity and said outlet;

said one valve being completely closed before said other valve is opened preserving pressure in flow lines leading to said other valve.

4,076,047

REED VALVE

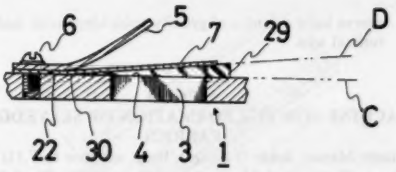
Masami Akahori, Shizuoka, Japan, assignor to Nippon Oil Seal Industry Co., Ltd., Japan

Filed Jun. 4, 1976, Ser. No. 692,914

Claims priority, application Japan, Jul. 16, 1975, 50-97821[U]

Int. Cl.[2] F16K *15/14*

U.S. Cl. 137—856 **14 Claims**



1. In a valve comprising a body having a valve port, a fixing seat on said body, a stopper, a reed valve plate covering said valve port said plate being flat in an unassembled state and in an assembled state interposed between said fixing seat of said body and said stopper, and a rubber elastic valve seat fixed onto the upper surface of said body surrounding said valve port bearing said reed valve plate, the improvement wherein the surface of said fixing seat of said body and the surface of said valve seat are not in the same plane, the surface of said valve seat is gradually diverged from the projection of the plane of the surface of said fixing seat and the thickness of said valve seat is gradually increased according to the increase of the distance from said fixing seat, said reed valve plate is biasingly bent in the neighborhood of the cross-point of said projection and the projection of the plane of the surface of said valve seat in an assembled state, and said reed valve plate extends along and is biased into contact with the surface of said valve seat.

4,076,048

SLEY DRIVE FOR A WEAVING MACHINE

Ulrich Bolleter, Seuzach, and Marcel Brugger, Winterthur, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jun. 3, 1976, Ser. No. 692,278

Claims priority, application Switzerland, Jun. 10, 1975, 7450/75

Int. Cl.[2] D03D *49/60*

U.S. Cl. 139—190 **15 Claims**

1. A sley drive for a weaving machine comprising

a sley shaft mounted for oscillation about a longitudinal axis,

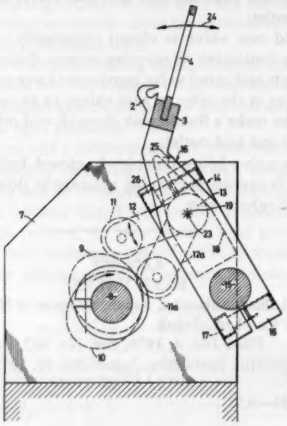
a reed,

a balance weight,

first means coupling said balance weight to said sley shaft for oscillation of said balance weight with said sley shaft about said longitudinal axis and,

second means coupling said reed to said balance weight for

oscillation therewith about said longitudinal axis whereby said shaft, reed, balance weight, first means and second



means have a center of gravity coincident with said longitudinal axis.

4,076,049

MACHINE FOR THE FORMATION OF SELVEDGES IN FABRICS

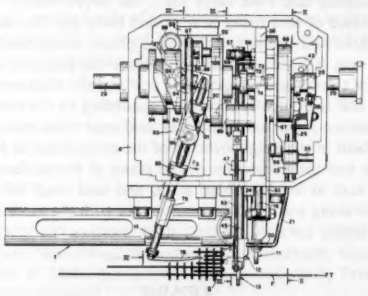
Antonio Manea, Schio (Vicenza), Italy, assignor to F.11i Manea S.n.c. Costruzioni Meccaniche Accessori Tessili, Schio (Vicenza), Italy

Filed Apr. 15, 1976, Ser. No. 677,484

Claims priority, application Italy, Apr. 16, 1975, 22411/75; Oct. 3, 1975, 27937/75

Int. Cl.² D03D *47/48*

U.S. Cl. 139—434 **3 Claims**



1. A machine for the formation of tucked-selvedges in fabrics formed with warp and weft threads by means of a shuttleless loom, wherein said machine comprises, in combination:

(a) a thread-seizing device movable between an advanced position in which it closes on the extremity of the last weft thread inserted extending outside the warp shed and a retracted position in which it takes said extremity of the weft to engage with a stationary thread-seizing device positioned laterally with respect to the thread-seizing, so that a section of said weft thread extremity is pinched between the thread-seizing devices;

(b) a scissors positioned between the thread-seizing devices and actuable so as to cut said section of weft extending between the thread-seizing devices;

(c) first actuating means cooperating with the thread-seizing device in order to return it, with the weft thread extremity extending from the warp and just cut by the scissors, to the aforesaid advanced position and then again to retracted position passing through a raised position;

(d) a hook needle movable from a position within a seating of the template of the loom above the fabric being formed, through a succeeding warp shed, to a position protruding from the said warp shed below the thread-seizing device to be returned to the retracted position gripping the extremity of the weft extending from the shed and previously cut by the scissors, so that said extremity of the weft is released by the thread-seizing device and is seized by the hook needle which, returning within the seating in the template inserts it folded into the shed which closes to form on the fabric the tucked-selvedge; and

(e) with the aforesaid first actuating means adapted to move in a correct operating sequence the movable thread-seizing device cooperating additional actuating means adapted to open and close the stationary thread-seizing device and the scissors and to move the hook needle in a correct operating sequence.

4,076,050

SHED FORMING DEVICE ON AN UNDULATED SHED LOOM

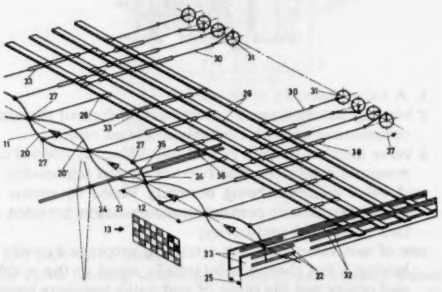
Edgar Strauss, Agincourt, Canada, assignor to Ruti Machinery Works Ltd, Ruti, Switzerland

Filed Nov. 26, 1975, Ser. No. 635,401

Claims priority, application Switzerland, May 17, 1974, 6768/74

Int. Cl.² D03D *47/26*

U.S. Cl. 139—436 **13 Claims**



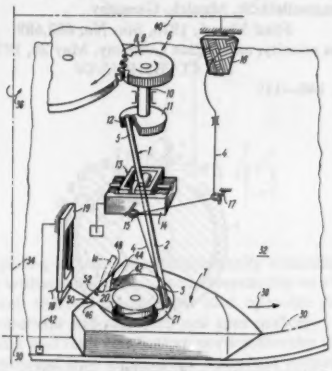
1. A shed forming device on an undulated shed loom in which during operation sheds are formed one after the other in a sinusoidal movement and shed forming heddles are arranged along flexible cables and held by them, and the flexible cables during the operation of the loom carry out a sinusoidally advancing movement for the production of which drive points arranged spaced apart from each other are provided on each of said cables, there being provided operational members extending in the width-wise direction of the loom, each operational member being operatively coupled to drive points of one of the corresponding flexible cables by a coupling means, for each cable there being provided individually movable operational members while lie parallel to each other in a single plane and which are of straight, elongate and rod-like shape, each of said operational members being driven by an individual driving means.

4,076,051

APPARATUS FOR CHARGING WEFT THREAD CARRIERS

Alexandr Alexandrovich Zabotin, Belayaevo-Borgorodskoe, kvartal 45, korpus 26, kv. 85, Moscow; Evgeny Dmitrievich Loschilin, Domodedovo, ulitsa 8 Marta, 34a, Moskovskaya oblast, Domodedovo; Eduard Arshakovich Onikov, ulitsa Panferova, 5, korpus 2, kv. 106; Alexandr Lvovich Galperin, ulitsa Moldagulovoi, 10, korpus 3, kv. 166, both of Moscow, all of U.S.S.R.; Nicola Santucci, Schio (Vicenza), 32, and Luciano Corain, Vicenza, both of Italy

Filed Sep. 20, 1976, Ser. No. 724,763
Claims priority, application U.S.S.R., Sep. 23, 1975, 2170554
Int. Cl.[2] D03D *47/26*
U.S. Cl. 139—436 8 Claims



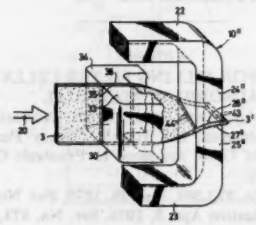
4. In an apparatus for charging, in wave-type shedding looms, weft thead carriers which move in a given plane during the charging thereof, an elongated rod having opposed ends one of which is formed with an opening through which weft thread is adapted to pass, support means supporting said rod for tilting movement in all directions, and drive means operatively connected to said rod for describing at least at said one end thereof a circle situated in a plane parallel to said given plane, while said rod tilts with respect to said support means, whereby thread issuing from said opening at said one end of said rod can be introduced into a carrier for charging the same.

4,076,052

SYSTEM FOR TRANSFERRING A YARN FROM ONE PART OF A TEXTILE MACHINE TO ANOTHER PART

Hans Demuth, Winterthur, Switzerland, and Jose R. A. Ferreira, Alverca do Alentejo, Portugal, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jul. 6, 1976, Ser. No. 703,003
Claims priority, application Switzerland, Jul. 4, 1975, 8736/75
Int. Cl.[2] D03D *47/24, 47/34*
U.S. Cl. 139—439 8 Claims



1. A system for transferring a yarn from one part of a machine to a second part of the machine comprising

a first clip at a yarn transfer position having a first pair of jaws, each of said jaws having a clamping surface facing a clamping surface on the other of said jaws, and at least one of said jaws being movable relative to the other of said jaws; and

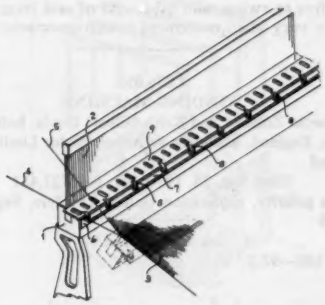
a second clip disposed coaxially of said first clip at said yarn transfer position and having a second pair of jaws, each of said jaws having a clamping surface facing a clamping surface on the other of said jaws, and at least one of said jaws being movable relative to the other of said jaws, said clamping surfaces of said second pair of jaws being disposed in cross-wise relation to said clamping surfaces of said first pair of jaws at an angle differing from 90° by at least 4°.

4,076,053

MEANS GUIDING THE STRAPS OF THE WEFT CARRYING GRIPPERS INSIDE THE SHED

Graziano Genini, Stabio, Switzerland, assignor to Albatex A.G., Vaduz, Liechtenstein

Filed Jul. 12, 1976, Ser. No. 704,630
Int. Cl.[2] D03D *47/18*
U.S. Cl. 139—449 9 Claims



1. In a system for guiding inside the warp yarns shed the straps of weft carrying grippers in shuttleless weaving looms comprising a sley and a reed, of the type in which said grippers are moved backward and forward into the shed between upper and lower laps of the warp yarns by a pair of flexible straps arranged in a substantially horizontal plane parallel to the sley; the improvement in which said straps freely bear on the lower lap of the warp yarns and are guided along at least one side edge by a plurality of guides upstanding from the sley, said guides being separate from each other and individually secured to the sley and extending through the sley, and means bearing against the underside of the sley for releasably securing said guides to the sley.

4,076,054

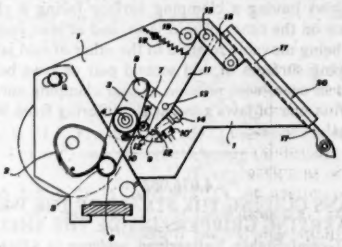
WEFT PRESENTING DEVICE FOR LOOMS WITH SELECTIVE WEFT FEED

Alberto Merisio, Colzate (Bergamo), Italy, assignor to Somet Societa' Meccanica Tessile S.p.A., Gazzaniga (Bergamo), Italy

Filed Oct. 4, 1976, Ser. No. 729,366
Claims priority, application Italy, Oct. 3, 1975, 27928/75
Int. Cl.[2] D03D *47/34*
U.S. Cl. 139—453 5 Claims

1. Apparatus for selectively presenting weft threads into position to be picked up and down into successive sheds of a loom, comprising a plurality of weft thread presenting rods, and means for advancing and retracting a selected said rod in the direction of its length, said means comprising, associated with each said rod, a rotary cam, a pawl, a lever connected to a said rod, means interconnecting said cam and said lever for moving a point intermediate the length of said lever through a

predetermined path, means for selectively engaging and disengaging one end of said lever with and from said pawl, whereby when said one end of said lever is engaged with said pawl, said lever swings about its said one end and the other end of said lever imparts to the associated said rod a movement of substantial magnitude but when said pawl is disengaged from said one end of said lever said one end of said lever is free to swing relative to said pawl, and means restricting movement of the other end of said lever whereby when said one end of said lever is free to swing, said other end of said lever imparts at most only very small movement to said associated rod.



4,076,055

WINDING MACHINE

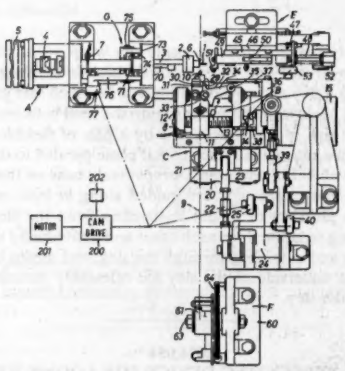
Peter Martin Zolman, and Keith Gilbert Doyle, both of Twickenham, England, assignors to Alfred Bader Limited, Surrey, England

Filed Sep. 28, 1976, Ser. No. 727,431

Claims priority, application United Kingdom, Sep. 29, 1975, 39777/75

Int. Cl.² B21F *3/04*

U.S. Cl. 140—92.2 **4 Claims**



1. A coil winding machine comprising a mandrel on which a coil is to be wound, a wire guide for guiding wire onto said mandrel in a correct position for forming a wire coil on said mandrel, a first stepping motor for providing a rotary motion between said mandrel and said wire guide, a second stepping motor, a rotary to straight line motion converting mechanism connected to said second stepping motor for providing a longitudinal displacement between said mandrel and said wire guide and electronic control means comprising a programmer in which desired parameters for controlling said stepping motors for producing a desired coil are set, a velocity generator connected to said programmer for generating a number representative of a desired rotational speed of said mandrel, a clock pulse generator providing clock pulses to said velocity generator, a first arithmetic unit supplied with said number representative of said desired rotational speed of said mandrel and with a fixed scale factor, means for connecting said arithmetic unit to said first stepping motor, a second arithmetic unit supplied with said number representative of said desired rotational speed of said mandrel, with a variable scale factor representing turns per unit distance of the desired coil to be wound and with a wire guide return factor for controlling return operation of said longitudinal movement between said mandrel and said wire guide and means for connecting said second arithmetic unit to said second stepping motor.

4,076,056

WIRE WRAPPING DEVICE FOR CONNECTING AN INSULATED ELECTRICAL WIRE TO AN ELECTRICAL CONTACT PIN

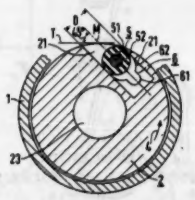
Fritz Dümmel, Nuremberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 6, 1976, Ser. No. 683,689

Claims priority, application Germany, May 26, 1975, 2523247

Int. Cl.² B21F *15/04*

U.S. Cl. 140—119 **4 Claims**



1. In a wire wrapping device for connecting an insulated electrical wire comprising a wire core and electrical insulation surrounding said core to an electrical contact pin including a wrapping sleeve, a rotatable cylindrical wrapping spindle disposed within said wrapping sleeve having an axially-disposed aperture opening at one end thereof for receiving said contact pin and a continuous wire guiding canal disposed in the surface of said spindle, said canal having curved, U-shaped stripping knives disposed therein opening towards the surface of said spindle for receiving and cutting said electrical insulation from said wire, said knives defining a first cutting opening having a width corresponding to the cross-sectional dimension of said insulated electrical wire and a second cutting opening having a width which is at least the same as the diameter of said wire core, the improvement comprising said stripping knives being disposed in said wire guiding canal so that the longitudinal axes of said knives are disposed at an angle ranging between about 30° and about 60° with respect to the tangent at the intersection of said longitudinal axes of said knives and the surface of said wrapping spindle, and said knives being positioned from the end face of said one end of said spindle by a distance which is at least several times greater than the diameter of said insulated electrical wire.

4,076,057

METHODS FOR FILLING FILTER CELLS WITH ADSORBENT MATERIAL

Ivars Sigurds Spulgis; Jack Leland Pettit; Michael Duane Allard, all of Columbus, and Harold Cheney Parish, Upper Arlington, all of Ohio, assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 572,580, Apr. 28, 1975, Pat. No. 4,030,639. This application Apr. 5, 1976, Ser. No. 673,840

Int. Cl.² B65B *3/00*

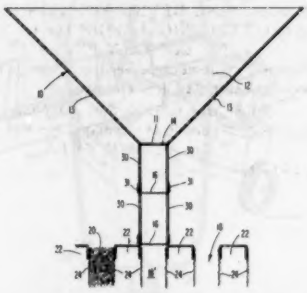
U.S. Cl. 141—1 **9 Claims**

1. A method, for filling a longitudinally extending vertically oriented filter cell, with a uniformly packed density of granular adsorbent material whereby subsequent gas flow through said

filled cell is uniform across the cell face, comprising the steps of:

a. positioning a longitudinally extending openable bottom portion of a reservoir of granular adsorbent material above a longitudinally extending apex orifice of an empty vertically oriented filter cell;

b. aligning a first open end of a longitudinally elongated collimating conduit with said reservoir openable bottom portion and aligning a second open end of said conduit with said longitudinally extending apex orifice of said filter cell;



c. interposing at least one longitudinally extending planar mesh within said conduit and perpendicular to a collimating wall thereof, intermediate said openable portion of said reservoir and said filter cell apex orifice;

d. opening said reservoir bottom portion thereby dispensing a downward flow of granular adsorbent material therefrom through said collimating conduit and said meshes and into said filter cell apex orifice; and

e. removing said reservoir from above said cell thereby halting downward flow of granular adsorbent material into said cell when said cell is filled.

4,076,058

ELECTRIC STORAGE BATTERIES

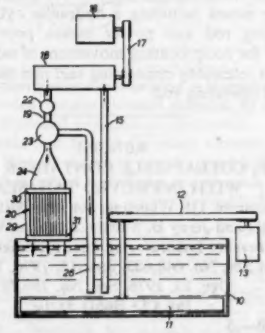
Barry Culpin, Bolton, and Gordon Alexander Clegg, Rossendale, both of England, assignors to Chloride Group Limited, London, England

Filed Oct. 14, 1976, Ser. No. 732,538

Claims priority, application United Kingdom, Oct. 15, 1975, 42362/75

Int. Cl.² B65B *3/04*

U.S. Cl. 141—1.1 **5 Claims**



1. A method of filling enveloped plates for batteries which comprises introducing an active material composition into the porous envelope of an enveloped plate when the envelope is assembled on the current conducting element of the plate characterised in that the active material composition is introduced into the envelope as an aqueous slurry, which has a degree of sulphation in excess of 50% and a rotating vane viscometer torque value (as herein defined) of not more than 0.2 lbs ft at 20° C, that said aqueous slurry being introduced into the envelope at a pressure of less than 5 psi until the envelope is filled with the composition, liquids issuing through the walls of the envelope, the pressure then being allowed to rise to a value above 5 psi but not in excess of 70 psi, the pressure there after being released.

4,076,059

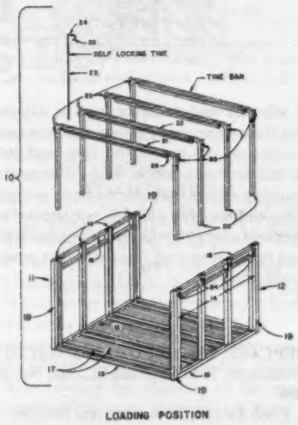
APPARATUS FOR LOADING TOBACCO IN BARNS

Frank W. MacIntosh, Mount Holly, N.C., assignor to Gas-Fired Products, Inc., Charlotte, N.C.

Division of Ser. No. 671,279, Mar. 29, 1976, Pat. No. 4,032,023. This application Mar. 7, 1977, Ser. No. 774,592

Int. Cl.² B65B *1/04*

U.S. Cl. 141—390 **3 Claims**



1. A loading sleeve having a correspondingly shaped tobacco container of a given uniform height removably contained therein, said loading sleeve being of a size in all dimensions such that said container is removably contained therein said loading sleeve including first two opposed wings which extend vertically above said container and are attached to opposed sides of the sleeve and having second two opposed wings extending vertically above the container and attached to other opposed sides of said sleeve, the said second two wings having a smaller vertical dimension at their mid-points than at their junctures with the first two opposed wings and having a concave configuration in elevation, whereby tobacco can be loaded into the container by loading the tobacco up to the level and contour of the wings thereby the loaded tobacco will have a concave top such that when the tobacco is compressed from the level of the wings to the level of the container a uniform density of the compressed tobacco is achieved within the confines of the container.

4,076,060

ENERGY SAVING TREE HARVESTER

Thomas L. Bestard, Woodstock, Canada, assignor to Eaton Yale Ltd., Ontario, Canada

Filed Mar. 23, 1977, Ser. No. 780,575

Int. Cl.² A01G *23/08*; B27L *1/00*

U.S. Cl. 144—3 D **9 Claims**

1. An apparatus for felling and delimbing a tree comprising:

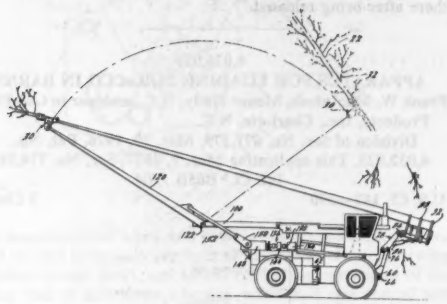
means for severing the trunk of a standing tree;

means for felling a tree from a standing position to a fallen position;

delimbing means cooperating with the felling means and

operable to delimb the tree in a substantially continuous operational step as the tree trunk is moved from the standing position to the fallen position, said delimbing means icluding a delimber head which removes branches from the trunk of the tree as the delimber head is moved along the trunk of the tree, and a delimbing boom for moving the delimber head along the tree trunk; and

drive means for moving said delimbing boom from a first



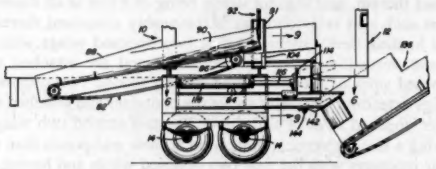
position wherein said delimber head is adjacent the butt end of the tree to a second position wherein said delimbing head is adjacent the top of the tree, and stopping said boom in said second position, said drive means including energy storing means operable to store energy dissipated in bringing said boom to a stop in said second position and to transfer said energy to the boom to accelerate the boom when said boom is moved from said first position toward said second position.

4,076,061

FIREPLACE WOOD CUTTING MACHINE

Carroll D. Greeninger, 7965 SE. 92nd St., Apt. No. 20, Portland, Oreg. 97266

Filed Jul. 19, 1976, Ser. No. 706,290
Int. Cl.[2] A47J *42/09*; B27L *7/00*
U.S. Cl. 144—3 K **16 Claims**



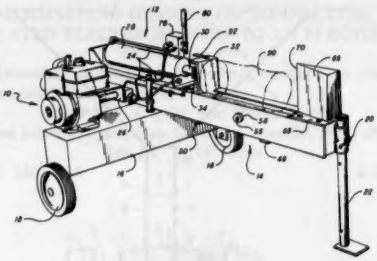
1. In combination, an elongated support frame including inlet and outlet ends, said inlet end including an inclined loading conveyor with its lower end remote from said outlet end, drag cable winch means carried by an upper portion of said support frame and having a drag cable mounted thereon for winching logs lengthwise toward said conveyor from outwardly of said inlet end, shear means mounted on said frame adjacent the upper end of said conveyor for shearing log end portions being discharged from the upper end of said conveyor, elongated trough means supported from said frame and including one end for receiving log end portions from said shear means, force means for engaging and forcing a log end in said one end toward the other end of said trough means against which a cut log end forced along said trough means by said force means may be forced for splitting said cut log end into multiple log sections, said upper portions of said frame including longitudinally extending support track means, a traveling overhead winch assembly mounted on said track means movement therealong, said overhead winch assembly including lift cable means for engagement with and elevating the mid portion of a log supported from said loading conveyor.

4,076,062

POWER DRIVEN LOG SPLITTER

Robert W. Kanik, Alder Creek, N.Y., assignor to R. Kanik Sales, Ltd., Black River, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,475
Int. Cl.[2] B27L *7/00*
U.S. Cl. 144—193 A **6 Claims**



1. A power-operated log splitter comprising, in combination:
(a) a stationary splitting wedge having a vertically disposed cutting edge;
(b) frame means including a pair of U-shaped channel members fixedly positioned in spaced relation with the free edges of the two members being parallel and facing one another in substantially horizontal planes, whereby a log may be longitudinally supported upon the opposing free edges on the upper side of said two members;
(c) means fixedly securing said wedge to said frame means;
(d) a linearly reciprocating ram element having integrally formed upper and lower portions separated by notches extending into each side of said element along the entire length thereof;
(e) said channel members on the upper side of said two members extending into said notches to attach said ram element to said frame means for sliding movement along said channel members;
(f) the upper sides of each of said channel members including adjacent cut-out areas having a combined length and width at least as great as the length and width of said lower portion of said ram element, whereby said ram element may be disconnected from said rod and removed from attachment with said frame means by removal of said lower portion through said cut-out areas;
(g) drive means including a hydraulic cylinder having an operating rod and power means providing hydraulic power for reciprocating movement of said cylinder; and
(h) means releasably connecting said ram element to the end of said operating rod.

4,076,063

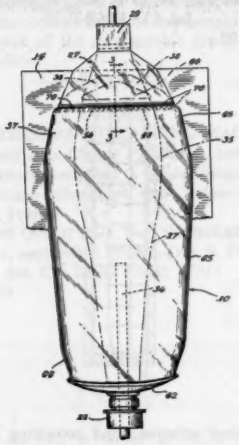
FLEXIBLE, COLLAPSIBLE CONTAINER FOR LIQUIDS WITH IMPROVED TAIL SEAL

Frank Cammarata, III, Wheeling; Joe Alan Miller, Lake Zurich, both of Ill., and Jerry D. Martin, Kenosha, Wis., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Division of Ser. No. 648,603, Jan. 12, 1976. This application Dec. 13, 1976, Ser. No. 750,791
Int. Cl.[2] B65D *33/02*
U.S. Cl. 150—.5 **3 Claims**

1. In a hollow, tubular container including a head portion with access means to the contents of the container, and a tail portion defining a sealed line in said tail portion joining sides of said container into a sealed end, and a flat plastic piece formed integrally with said sealed line and extending away therefrom,

the improvement comprising, in combination, a pair of spaced rod members formed as an integral part of said sealed line and flat plastic piece, said rod members extending transversely to the longitudinal axis of said container across its entire width, said flat plastic piece also defining a portion thereof between



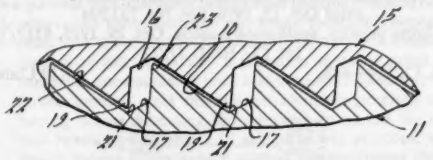
said rod members which is thinner than the remainder of said plastic piece spaced from said rod members, said container having a generally uniform wall thickness of no more than 0.05 inch in the wall of said container adjacent said flat plastic piece, whereby said rod members and intermediate portion therebetween provide an improved and stronger tail seal.

4,076,064

LOCKING THREAD CONSTRUCTION

Horace D. Holmes, 28576 Green Willow, Farmington Hills, Mich. 48018

Continuation of Ser. No. 620,566, Oct. 8, 1975, abandoned. This application Dec. 29, 1976, Ser. No. 755,437
Int. Cl.² F16B *39/30*
U.S. Cl. 151—14 R 9 Claims



1. A fastener combination comprising a threaded male element and a threaded female element adapted to receive the male element in threaded engagement therewith;

each of the male and female threaded elements having a thread form thereon defined by leading and trailing helical flanks, which intersect to define a crown each flank lying at an angle relative to the common longitudinal thread axis of the fastener combination;

the female element including a truncated coat adjacent the major diameter thereof, said truncated coat defining a helical flat extending between the trailing flank and the adjacent leading flank which faces said trailing flank, and said flat, throughout its axial extent, lying at an angle between about 20° and 30° relative to the thread axis which is substantially less than the angle of the male element flank which tends to converge on said flat under axial tension load; said flat angled radially outward from said trailing to said adjacent leading flank.

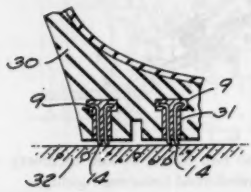
whereby axial tension loading of the combination tends to displace the crown of the male thread into contact with the flat to prevent movement between the elements transverse to said axis and lock elements.

4,076,065

TIRE STUD WITH ANTI-SKID SURFACE

Jay G. Somers, 1706 Chestnut St., Oshkosh, Wis. 54901

Continuation of Ser. No. 521,166, Nov. 5, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,495
Int. Cl.² B60C *11/16*
U.S. Cl. 152—210 2 Claims



1. An individual, discrete anti-skid stud for insertion into a hole in the surface of a resilient automotive tire comprising

a generally cylindrical matrix body,

a matrix base at the inside end of the matrix body, the matrix base having a larger diameter than the matrix body,

at least two wires of a material of greater wear resistance than the material of the matrix body and base,

said wires being embedded in the matrix body in parallel,

portions of said wires extending outwardly from the end of the matrix body opposite the matrix base,

retaining means on each of said wires; said retaining means extending outwardly in spaced radial direction into the matrix base beyond the diameter of the matrix body to securely embed the wires in the matrix body,

each retaining means being an integral part of its associated wire and carried thereform into said matrix base to define a generally L-shaped configuration.

4,076,066

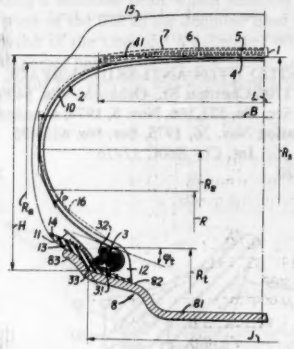
PNEUMATIC TIRE

Henri Verdier, Beauregard-l'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France

Filed Jul. 29, 1975, Ser. No. 600,125
Claims priority, application France, Aug. 5, 1974, 74 27217
Int. Cl.² B60C *9/02, 9/18, 15/00*
U.S. Cl. 152—354 R 5 Claims

1. A pneumatic tire comprising a tread, a pair of side walls respectively extending inwardly from the edges of the tread, a pair of beads respectively at the inner edges of the side walls, a pair of bead rings respectively reinforcing said beads, a carcass reinforcement formed of radial cords anchored to the bead rings, a tread reinforcement formed with reinforced edges and comprising at least two plies of cords parallel in each ply and crossed from one ply to the other at a slight angle with respect to the circumferential direction of the tire, the aspect ratio H/B of the height H on the rim to the largest axial width B of the carcass reinforcement being at most equal to 0.6, characterized in that, when the tire is mounted on a rim and inflated, the rim being of standard diameter and the rim width being substantially equal to the width of the tread reinforcement, then the carcass reinforcement, seen in meridian section, follows its natural equilibrium profile between the zone of contact of the side walls with the tread reinforcement and the zone of contact of the side walls with the respective bead rings, said profile

meeting the bead rings in tangent relation and the bead rings themselves comprising three members, each of said members



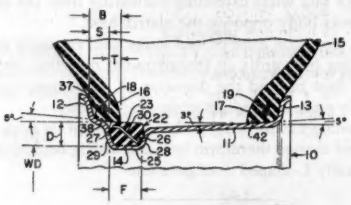
being tangent to two others of said members, the bead rings thus having a reinforced torsional rigidity.

4,076,067

ELASTIC WHEEL WELL FILLER

Michael L. Gill, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 3, 1976, Ser. No. 663,514
Int. Cl.² B60C *15/02*
U.S. Cl. 152—381.6 **9 Claims**



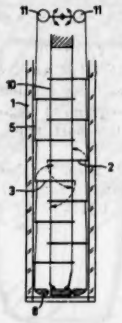
1. In combination, a wheel rim for mounting a tire of the type having a bead portion with a circumferentially extending bead, said rim having a generally cylindrical portion, a side flange on one side of said rim, a circumferentially extending wheel well in said generally cylindrical portion adjacent said side flange, said wheel well having an axial width greater than the width of said bead portion and being spaced from said side flange a distance less than the width of said bead portion providing a bead seating flange adjacent said side flange so that said bead portion will extend over a portion of said well, a wheel well filler for mounting in said wheel well comprising a flexible ring having a radially outer surface, a radially inner surface for seating in the bottom of said well, a side surface connecting said inner and outer surfaces and abutting a side of said well spaced from said bead seating flange, a plurality of rigid retainer members located in said ring at circumferentially spaced-apart positions, each of said retainer members extending from a first position under said bead spaced from said side surface and adjacent said bead seating flange of said rim to a second position closer to said radially inner surface and in close proximity to said side surface of said ring and to said side of said well so that said bead portion will overlap the end of each of said retainer members at said first portion and the retainer members will limit deflection of said ring at said side surface by said side of said well to prevent rotation of said ring out of said wheel well when subjected to centrifugal force.

4,076,068

INSULATING VENETIAN BLIND

John Neville Archer, Nynashamn, and Hans Folke Larsson, Vasterhaninge, both of Sweden, assignors to Rederiaktiebolaget Nordstjernan, Stockholm, Sweden

Filed Jun. 14, 1976, Ser. No. 695,571
Int. Cl.² E06B *9/30*
U.S. Cl. 160—107 **6 Claims**



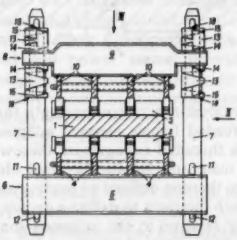
1. An insulating venetian blind consisting essentially of a number of thin blades, which are provided between the panes of glass of a double glass window and stretch from the inside edge of one side frame to the other across the whole window and which are turnable between a horizontal and a vertical position, characterized in that in the vertical position the blades (2, 3) form at least mainly tight walls being spaced apart and forming between them an integral and substantially closed air space, thereby reducing heat losses through a double glass window to at least equal low heat losses as through a window with three panes of glass.

4,076,069

STRAND GUIDE TO BE USED IN A CONTINUOUS CASTING PLANT

Alois Scheinecker, and Werner Scheurecker, both of Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Austria

Filed Oct. 15, 1976, Ser. No. 732,934
Claims priority, application Austria, Oct. 29, 1975, 8217/75
Int. Cl.² B22D *11/12*
U.S. Cl. 164—448 **10 Claims**



1. In a strand guide to be used in a continuous casting plant and having oppositely arranged frame parts, drawing anchors connecting the frame parts and strand guiding rollers journaled in the frame parts, at least one of the frame parts being a displaceable frame part which is movable along the drawing anchors and fixable thereon, the improvement comprising:

two rotatable bushings having helical supporting faces provided on each drawing anchor and rotatable therearound, the displaceable frame part being located on said drawing anchors between said two rotatable bushings;

two fixed abutments provided on each drawing anchor on opposite sides of the displaceable frame part, the fixed abutments securing the two rotatable bushings on each drawing anchor; and

sliding elements provided on opposite sides of the displaceable frame part on each drawing anchor for contacting the helical supporting faces of the rotatable bushings and translating the rotary motion of the rotatable bushings into a displacement of the displaceable frame part on each drawing anchor.

4,076,070

LOW-PRESSURE DIECASTING MACHINE

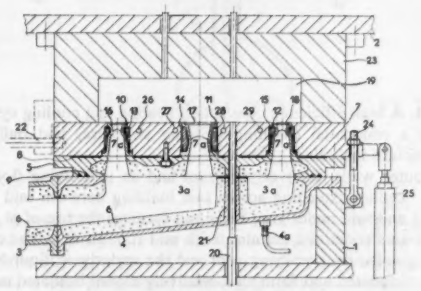
Jean Lefebvre, and Jean-Claude Pichouron, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

Filed Oct. 1, 1975, Ser. No. 618,485

Claims priority, application France, Oct. 9, 1974, 74.33918

Int. Cl.[2] B22D *17/00, 27/14*

U.S. Cl. 164—303 **3 Claims**



1. An improved automatic low-pressure diecasting machine of the type having separable upper and lower mould portions wherein molten metal is forced by gaseous pressure into the casting cavity, the improvement comprising:

a plurality of feed inlets arranged substantially vertically through the bottom of said lower mould portion and opening into the casting cavity, and

a separable heat-insulated distribution chamber formed of an upper and lower portion and being thermally insulated from said lower mould portion said distribution chamber having an inlet port and a plurality of outlet ports arranged to communicate with said feed inlets in said lower mould portion, said distribution chamber portions also having bosses extending therethrough to permit the mutual bearing engagement of said chamber portions, said bosses having bores axially aligned and extending therethrough, said bores communicating with an axially aligned bore in said lower mould portion and and ejector rod extending through said bores in said bosses and through said bore in said lower mould portion into said casting cavity for removing the casting from the cavity.

4,076,071

METHOD FOR HEATING PLASTICS MATERIALS

Otto Rosenkranz, Hamburg; Heinz Goos, Schenefeld, and Karl-Heinrich Seifert, Hamburg, all of Germany, assignors to Heidenreich & Harbeck Zweigniederlassung der Gildemeister AG, Hamburg, Germany

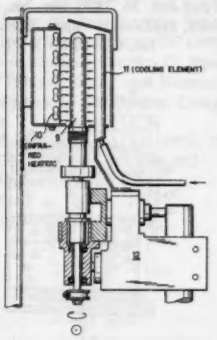
Filed Oct. 22, 1974, Ser. No. 516,904

Claims priority, application Germany, Oct. 22, 1973, 2352926

Int. Cl.[2] F25B *13/00;* **B28B** *11/08*

U.S. Cl. 165—2 **4 Claims**

2. A method of heating an essentially tubular parison formed of a heat degradable thermoplastic material from a temperature at which the parison is essentially non-deformable and non-workable to a temperature at which the parison is deformable and workable, comprising the steps of placing a tubular parison at a non-deformable temperature onto a laterally displaceable and rotatable carrier, laterally displacing the carrier and conveying the parison past a bank of infra-red heaters while (a) simultaneously rotating the carrier and the parison about a



common longitudinal axis and (b) directing a stream of gaseous coolant onto the surface of the rotating parison to prevent overheating of the surface of the parison while facilitating heating the interior of the parison, and displacing the tubular parison from adjacent the radiant heaters at a deformable, workable temperature.

4,076,072

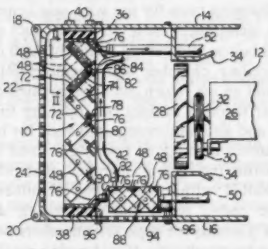
MODULAR HEAT EXCHANGER WITH PIVOTAL CORES

Erwin John Herman Bentz, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 9, 1975, Ser. No. 620,999

Int. Cl.[2] F28G *13/00*

U.S. Cl. 165—41 **19 Claims**



18. A heat exchanger, comprising:

a plurality of cooling cores each having first and second opposed outer surfaces and first and second opposed edges, said cooling cores being generally positioned in side by side relationship and movable between a first position at which the first edges of adjacent cores are in close proximity and oriented for passing cooling fluid through the cores in a direction from the first surface to the second surface and a second position at which the second edge of adjacent cores are in close proximity and oriented for passing cooling fluid through the cores in a direction from the second surface to the first surface;

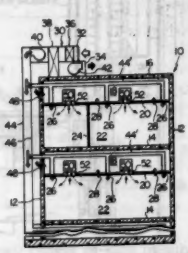
means for pivotally mounting said cores for pivotal movement of the cores less than 180° during movement between the first and second positions.

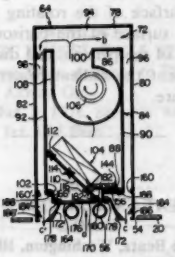
4,076,073

COMBINATION RE-CONDITIONING UNIT AND ILLUMINATING APPLIANCE FOR USE WITH CENTRAL AIR CONDITIONING SYSTEM

Toshio Yamamoto; Jyoji Kamata; Shigeo Murase, and Kouichirou Yamaguchi, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 26, 1976, Ser. No. 652,155
Claims priority, application Japan, Feb. 18, 1975, 50-20521
Int. Cl.[2] F24D 5/10
U.S. Cl. 165—53 31 Claims





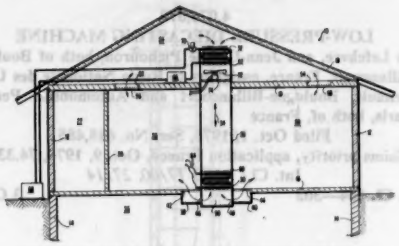
1. In a building having a wall structure and a central air conditioning system and with at least one ceiling chamber having the bottom defined by a ceiling panel, a combination of one of re-conditioning units for use with said central air conditioning system including a main air supply duct communicating with spaces below said ceiling panel through ducts passing through said ceiling chamber and openings formed in said ceiling panel and an air return duct communicating with said ceiling chamber through at least one opening formed in said wall structure and an illuminating appliance for installation in the ceiling chamber through an opening formed in the ceiling panel which forms the ceiling chamber, said re-conditioning unit being installed within the ceiling chamber above said opening in the ceilng panel and comprising casing means formed with a plurality of separate chambers which are arranged in series longitudinally of said casing means and which include a conditioning chamber having blower means for circulating therethrough air from the space below said ceiling panel and back into the space below and a heat-transfer chamber having heat exchange means therein for passing therethrough and conditioning air from said ceiling chamber and back into the ceiling chamber, said casing means further having an air inlet opening located at the bottom of said conditioning chamber and at least one air outlet opening located at the bottom of the casing means, and said illuminating appliance being positioned immediately below said casing means and having its lower end exposed to said space below the ceiling panel through said opening in the ceiling panel and having an air inlet opening upwardly in communication with said air inlet opening in said casing means and at least one air outlet opening upwardly in communication with said air outlet opening in said casing means and which is open at the lower end of the illuminating appliance to the space below the ceiling panel.

4,076,074

HIGH EFFICIENCY NATURAL CONVECTION HEATING AND COOLING SYSTEM FOR HOME DWELLINGS

Leo L. Tompkins, Jackson, Miss., assignor to Xenco, Inc., Jackson, Miss.

Filed May 27, 1976, Ser. No. 690,820
Int. Cl.[2] F24H 9/08; F24D 5/10
U.S. Cl. 165—53 3 Claims



1. A high efficiency convection heating and cooling system for a residential dwelling building structure, said building structure including:

outer walls, an overlying roof and an underlying floor, a ceiling extending across said building between said roof and said underlying floor and forming the top of at least one room and defining with said roof an attic, the outer walls, the overlying roof and the underlying floor being insulated and forming a relatively closed insulated enclosure including said at least one room,

a closed vertical stack extending vertically within the center of said building structure from said floor and through said ceiling and terminating just beneath said roof, said stack comprising a tubular duct of maximum length from the floor through the ceiling and into said attic, said cooling coil being located within said stack at a level above said ceiling adjacent the open upper end of the same,

selectively energizable heating coil means mounted within said tubular duct at the lower end thereof in the vicinity of said floor to maximize lifting effort with respect to the heated air heated at the bottom of the stack and to maximize the dropping effort of the air cooled at the upper end of said tubular duct,

first air duct means extending from said at least one room in the vicinity of said floor to the lower end of said tubular duct,

second air duct means extending from the top of said at least one room to the top of said stack, said second air duct means comprising openings within the ceiling remote from said tubular duct for facilitating air flow by convection through said vertical tubular duct, said room and said first and second air duct means;

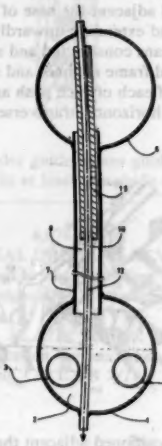
whereby, selective energization of said heating means effects heating of the air within said tubular duct to a greater degree than the air within said room to effect natural convection of air flow through said tubular duct in an upper direction to displace cold air within said tubular duct while selective energization of said cooling means within said tubular duct causes said air within said tubular duct at the top to cool to a greater degree than that within said at least one room to effect downward convection movement of said air within said tubular duct to provide draft free conditioning of the air within said at least one room.

4,076,075

YARN HEATING DEVICE

Jean Venot, Roanne, France, assignor to ASA S.A., Roanne, France

Filed Jun. 25, 1976, Ser. No. 699,713
Claims priority, application France, Jul. 10, 1975, 75.21797
Int. Cl.[2] F28D *15/00;* H05B *3/00;* F27B *9/08;* D02J *13/00*
U.S. Cl. 165—105 10 Claims



1. A yarn heating device comprising a lower vessel, a heat transfer liquid in said lower vessel, a heating device effective to vaporise at least a part of said heat transfer liquid, an upper vessel, at least one conduit connecting the upper vessel to the lower vessel, at least one yarn treatment tube passing within said at least one conduit for the passage of the moving yarn to be heated, and a metal heat conductive portion surrounding in thermal contact an upper part of said at least one treatment tube.

4,076,076

MECHANICAL HEAT EXCHANGE JOINT

Henry Harrison, Locust Valley, N.Y., assignor to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed Jul. 12, 1976, Ser. No. 704,374
Int. Cl.[2] F24J *3/02;* F28F *1/14, 1/22*
U.S. Cl. 165—171 7 Claims

1. A heat-conducting joint suitable for solar heat collectors comprising,

a tubular metal member for carrying heat-transfer fluid,

a sheet metal member in thermal contact with said tubular member, one of said members being pre-curved in a plane perpendicular to the surface of the sheet into a wave shape substantially consisting of a pluality of long radius arches joined by short radius cusps, and

means for first securing the other member while straight to the one member near its ends and while perpendicular to the long radius arches of the wave shape in a manner to prevent sliding of the other member on the one member, and

means for then securing said other member against said one member at said short radius cusps forming a wave shape in said other member,

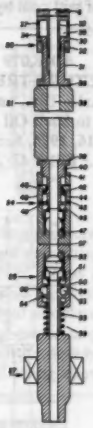
whereby the two members are pressed together elastically along at least one line of contact for efficient heat conduction between them.

4,076,077

WEIGHT AND PRESSURE OPERATED WELL TESTING APPARATUS AND ITS METHOD OF OPERATION

George J. Nix, London, England; Burchus Q. Barrington; David L. Farley, both of Duncan, Okla., and Norman G. Hortman, Laurel, Miss., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 593,648, Jul. 14, 1975. This application Dec. 2, 1976, Ser. No. 746,912
Int. Cl.[2] E21B *43/12*
U.S. Cl. 166—315 2 Claims



1. A method of operating a valve in a testing string having a flow channel therethrough and located in a fluid filled well bore, comprising the steps of:

providing a sealed chamber in said testing string;

creating a pressure differential between the pressure in said sealed chamber and fluid pressure in the well bore, wherein the pressure in said sealed chamber is independent of the pressure in the flow passage of said testing string;

applying weight in the testing string onto an operating mandrel means in said testing string, thereby moving said operating mandrel means in a first direction;

increasing the fluid pressure in the well bore by a predetermined amount, thereby increasing said pressure differential; and,

applying said increased pressure differential across a piston on said operating mandrel means, thereby overcoming the weight added to said operating mandrel means, and moving said operating mandrel means in a second opposite direction.

4,076,078

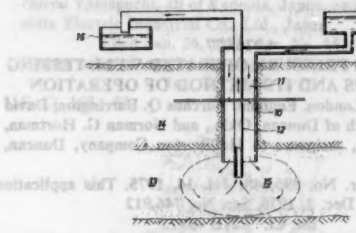
PROCESS FOR FORMING A COALATE SOLUTION IN-SITU

Gary Drinkard, Houston, and William A. McLaughlin, Bellaire, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 23, 1976, Ser. No. 716,906
Int. Cl.[2] E21B *43/24, 43/28*
U.S. Cl. 166—271 14 Claims

1. A process for dissolving a subterranean coal formation of

coal of high oxygen content which comprises contacting said coat with a heated basic aqueous solution at a temperature of



from about 175° to about 250° C. for a time sufficient to dissolve at least a portion of said coal by forming coalate solution.

4,076,079

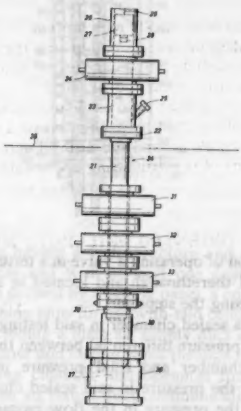
FULL BORE FRACTURE TREATING ASSEMBLY

Herman H. Herricks, Azle, Tex., and Richard L. Easterwood, Slidell, La., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 16, 1976, Ser. No. 714,869

Int. Cl.² E21B *43/26, 23/00*

U.S. Cl. 166—308 **8 Claims**



1. A method for fracturing down casing in an oil or gas well comprising, providing (a) a tubing hanger which seals with a tubing spool to prevent fracture fluid from affecting blowout preventors located concentrically thereabove and which is modified to support a section casing thereabove to allow full bore access into the well, (b) a fracture spool with an outlet for introducing fracturing fluid into the well, the spool being connected with the tubing hanger via the section casing, (c) closure means located above the fracture spool, and (d) a lubricator located above the closure means with a packer located therewithin; fracture treating the well with the closure means closed; opening the closure means and admitting the packer into the well; and securing the packer at a desired depth above the formation which has been fractured.

4,076,080

FRONT END LOADER ATTACHMENT

Walter J. Anderson, Two Harbors, Minn., assignor to Milton I. Larson, Two Harbors, Minn.

Continuation of Ser. No. 516,746, Oct. 21, 1974, abandoned. This application Apr. 1, 1976, Ser. No. 672,837

Int. Cl.² E02F *3/76*

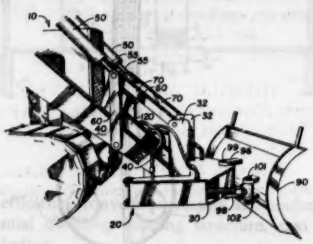
U.S. Cl. 172—804 **4 Claims**

4. A bulldozer blade attachment for use with a front-end loader having a push-beam assembly comprising a pair of push arms connected to the frame of said front end loader and having a pair of bucket control links actuated by hydraulic motor means for movement of such links generally parallel to the axis of said push arms, said attachment comprising:

(a) a generally U-shaped horizontal frame member having opposite rearwardly extending legs immovably connected by a transverse base;

(b) a pair of rigid upright transversely spaced pivot arms immovably mounted on said frame, one each of which being disposed adjacent the base of each of said opposite legs thereof and extending upwardly therefrom;

(c) first pivot means constructed and arranged for pivotally connecting said frame member and said pivot arms to the forward end of each of such push arms for pivotal movement about a horizontal transverse axis, said first pivot



means being positioned adjacent the lower end of each of said pivot arms;

(d) second pivot means carried by said pivot arms at a location spaced upwardly from said first pivot means and constructed and arranged to pivotally connect the forward end of each of such bucket control links of such a push beam assembly to a separate one of said pivot arms;

(e) a blade member having a backside pivotally connected to said frame base for pivotal movement about an axis extending normally of said frame base at a point intermediate and forward of the junction of said base and said legs of said frame member; and

(f) said blade member being rotatable with said frame member about said horizontal axis of connection between said pusher arms and said frame member when such bucket control links are actuated by such hydraulic means.

4,076,081

PILE DRIVING DEVICE

Hans Gunther Schnell, Hamburg, Germany, assignor to Van Kooten B.V., Naarden, Netherlands

Filed Dec. 5, 1975, Ser. No. 637,987

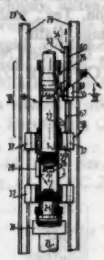
Claims priority, application Netherlands, Dec. 10, 1974, 7416079

Int. Cl.² E02D *7/12*

U.S. Cl. 173—137 **8 Claims**

1. In a diesel pile-driving device having at least one cylinder guide stay, and a diesel hammer consisting of a combustion cylinder, guide means for guiding the cylinder along said cylinder guide stay, a hammer piston operating in the combustion cylinder and a striker in the combustion cylinder for engagement by the hammer to transmit the blow of the hammer to a pile, the improvement comprising lifting means for elevating the hammer piston away from the striker in the first stroke of operation of the hammer without combustion in the cylinder, said lifting means comprising at least one catch support slidably mounted in said device with respect to said cylinder, catch means mounted in the support for engaging the piston through the combustion cylinder; and elevating means for lifting the support with respect to the cylinder for raising the piston therein, said elevating means including at least one hydraulic cylinder-piston set operatively connected between

the catch support and the combustion cylinder for lifting the catch support with respect to the cylinder; said cylinder-piston



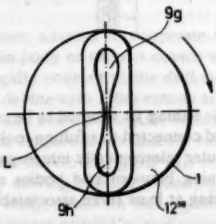
set engaging the cylinder guide means guiding the combution cylinder with respect to at least one guide stay.

4,076,082

THERMAL DRILLING DEVICE

Werner Baum, Flein, and German Munding, Bad Friedrichshall, both of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Germany

Filed Oct. 21, 1976, Ser. No. 734,424
Claims priority, application Germany, Feb. 20, 1976, 2607046
Int. Cl.[2] E21B 7/14
U.S. Cl. 175—14 **4 Claims**



1. A thermal drilling device operating in a rotary motion, particularly for drilling geological formations, comprising a drill body having an interior combustion chamber with a bottom having an outlet defining a discharge nozzle, said drill body being rotatable about an axis of rotation, means for generating hot gaseous products of combustion in said combustion chamber, said discharge nozzle having at least one slot shaped discharge opening for the hot gases having a radially extending portion with a circumferential width increasing in a radial outward direction.

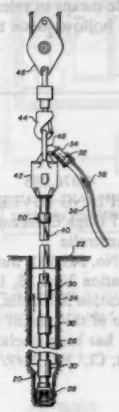
4,076,083

METHOD AND APPARATUS FOR CONTROLLING A WELL DURING DRILLING OPERATIONS

Philip S. Sizer, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Nov. 24, 1975, Ser. No. 634,824
Int. Cl.[2] E21B 23/04, 33/127, 41/00
U.S. Cl. 175—65 **38 Claims**

1. A downhole blowout preventer system for use in a well comprising:
a well casing;
a drill string in said well casing;
a drill bit on the lower end of said drill string;
tubular mandrel means forming a portion of said drill string;
packer means carried by said mandrel means;
drilling fluid to circulate in the well;
valve assembly means initially providing for normal, parallel drilling fluid circulation;
said valve assembly means selectively changing the circulation of said drilling fluid from normal parallel circulation through the drill string and through the annulus to controlled circulation by-passing said packer means when said packer means is actuated;
means for actuating said packer means to seal the annulus between said drill string and the well; and
means for controlling said valve assembly means.



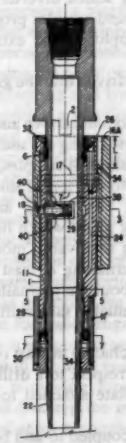
12. A method of controlling pressure in a well having a drill string with a drill bit therein comprising the steps of:
actuating downhole packer means to seal the annulus between the drill string and the well;
controlling the drilling fluid circulation at said packer means so that drilling fluid by-passes said packer means, continues to circulate around the drill bit and flows upward in the interior of the drill string above said packer means.

4,076,084

ORIENTED DRILLING TOOL

Robert E. Tighe, Chicago, Ill., assignor to Amoco Production Company, Tulsa, Okla.

Filed Jul. 16, 1973, Ser. No. 379,279
Disclosure was also published under second Trial Voluntary Protest Program on Jun. 10, 1976
Int. Cl. E21b 7/06
U.S. Cl. 175—73 **9 Claims**



1. An apparatus to be used in a borehole drilled by a drill bit at the lower end of a drill string, which comprises:

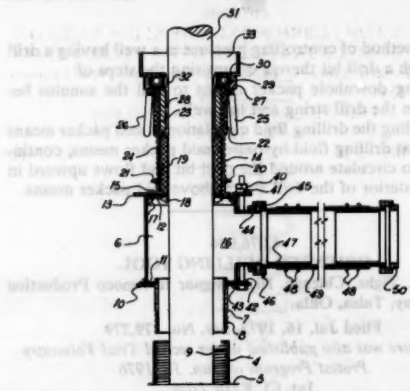
a. a hollow torque tube,
b. an inner cam sleeve having a cam-shaped cross section and rotatably mounted on the torque tube,
c. an outer cam sleeve having a cam-shaped cross section and rotatably mounted about said inner cam sleeve.
d. remotely actuatable means to releasably secure said outer cam sleeve to said inner cam sleeve,
e. remotely actuatable means to releasably secure said outer cam sleeve to said hollow toque tube.

4,076,085

DRILL SAMPLING DIVERSION UNIT

Barry Frederick Clark, 7 Bligh Crescent, Seaforth, Sidney, New South Wales, 2092, Australia

Continuation of Ser. No. 589,981, Jun. 2, 1975, Pat. No. 3,991,838. This application Nov. 15, 1976, Ser. No. 741,989
Claims priority, application Australia, May 31, 1974, 7743/74
The portion of the term of this patent subsequent to Nov. 16, 1993, has been disclaimed.
Int. Cl.[2] E21B *49/02*
U.S. Cl. 175—210 **9 Claims**



1. A self-centralizing sealed diverter for aiding the surface collection of underground samples produced by a drilling rig of the kind which employs fluid extraction comprising, in combination,

a. a first rigid casing driven into the ground to line a partially drilled hole,
b. a rigid chamber mounted above and firmly but removably attached to said first casing via sealing means and adapted to receive and retain drill samples,
c. a sleeve fastened to the top of said chamber and having therein a stuffing box having an at least partly self-lubricating stuffing gland which lines said box,
d. journalling means removably mounted upon the top of said sleeve for journalling at least one drill rod entering said sleeve from about the journalling means, and also for axially locating initially said stuffing gland which lines said box,
e. a second casing including at least one bearing for aligning the drill rod with respect to a drill head,
f. a protective top-plate attached to said second casing of said bearing, and
g. a pressed-in bush coupled to said bearing to be interposed between the rod and said bearing, said bush permitting little play between said bearing and the rod and being composed of material harder than the material of the rod.

4,076,086

FISHING JAR FOR ACCOMMODATION OF EXCESS TENSILE LOAD

Robert W. Evans, Houston, Tex., assignor to Baker International Corporation, Orange, Calif.

Filed Jan. 6, 1977, Ser. No. 757,358
Int. Cl.[2] E21B *1/10*
U.S. Cl. 175—297 **82 Claims**

1. In a hydraulic fishing jar adapted to be run into a well on a fishing string and connected to a fishing tool in the well bore:

(a) inner and outer telescopically interengaged bodies;
(b) means defining between said bodies a hydraulic fluid chamber having at least three associatable fluid chamber members;
(c) means in the chamber operable upon tensioning the fishing string for telescopic movement of said bodies to compress and apply a predetermined force to a plurality of said fluid chamber members;
(d) there being by-pass flow passage means in one of said bodies;
(e) valve means in the chamber for normally closing off one end of the by-pass flow passage means from the compressed fluid in the chamber and responsively activatable to open so that compressed hydraulic fluid is released to the by-pass flow passage means;
(f) flow by-pass means to transfer the compressed hydraulic fluid in the chamber and thereby move said fluid in said chamber to engage and move said valve means to open the by-pass flow passage means at one end to the compressed hydraulic fluid upon application of said predetermined force;
(g) pressure relief means activatable at forces substantially in excess of said predetermined force to meter fluid therethrough and to transfer fluid pressure resulting from said excess force and within one of said plurality of hydraulic fluid chamber members to another of said plurality of hydraulic fluid chamber members whereby said valve is engaged and moved to open the by-pass flow passage means at one end of the compressed hydraulic fluid chamber; and
(h) hammer and anvil means on said bodies movable into engagement when said valve member and valve means open the by-pass passage means to the chamber across said flow by-pass means.

4,076,087

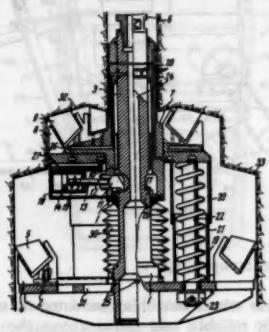
HOLE REAMER

Vladimir Yakovlevich Chuply, ulitsa Kosmonavtov, 36, kv. 35; Leonty Feofanovich Vojuta, ulitsa Studencheskaya, 4, kv. 19; Feofan Ilich Kondratenko, ulitsa Kosmonavtov, 36, kv. 5; Jury Zakharovich Poludnenko, ulitsa Karla Marxa, 47, kv. 21; Adam Arsentievich Milach, ulitsa Studencheskaya, 4, kv. 22; Vladimir Nikolaevich Kobozev, ulitsa Yanova, 3, kv. 1, and Alexandr Vasilievich Turchenko, ulitsa Kharitonova, 1b, kv. 32, all of Krivoi Rog, U.S.S.R.

Filed Jun. 14, 1976, Ser. No. 696,045

Int. Cl.[2] E21C *23/00*

U.S. Cl. 175—334 8 Claims



1. A hole reamer adapted to cooperate with a drill stem comprising a main body or support device with roller cutters adapted to be rigidly coupled to the drill stem; an additional body or support device with roller cutters arranged co-axially with said main body and mounted for rotary movement with said main body or support device and for relative axial movement with respect thereto along the axis of said main body; means for axially moving said additional support device relative to said main body; means for locking said additional body against axial movement relative to said main body at a predetermined axial distance therebetween, said main body and additional support device being arranged to successively operate on and destroy substantially distinct and separate portions of the face of the hole to be drilled.

4,076,088

BALANCE WITH A DIGITAL AND AN ANALOGUE DISPLAY

Mario Gallo, and Johannes Wirth, both of Zurich, Switzerland, assignors to Wirth, Gallo and Company, Switzerland

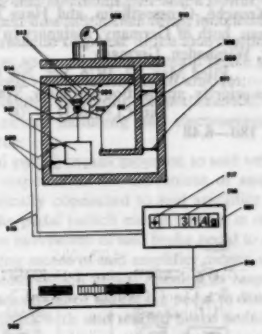
Filed Feb. 23, 1977, Ser. No. 771,315

Claims priority, application Switzerland, Jun. 9, 1976, 007322/76

Int. Cl.[2] G01G *3/14, 23/36*

U.S. Cl. 177—210 R 6 Claims

1. A scale having a digital display for digitally displaying the results of weighing operations, said results falling within discrete value ranges, the length of the highest value range being at least ten times bigger than the length of the lowest value range, an analogue display in said scale for simultaneous analogue displaying of said results of weighing operations, said analogue display comprising at least one group of optically activable elements forming a row, said elements corresponding each to one of said discrete value ranges and being connected to each other so that the elements corresponding to value



ranges lower than the value range to be displayed by activation of the corresponding element are also activated.

4,076,089

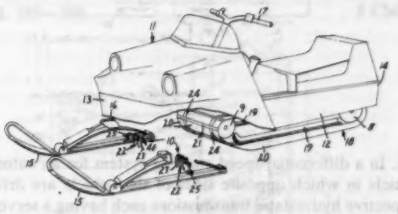
DEVICE FOR LUBRICATING THE SLIDE RAILS ON SNOWMOBILES TRAVELING OVER PACKED SNOW

David Leonard Sanders, 1424 18th Ave. NW, New Brighton, Minn. 55112

Filed Nov. 28, 1975, Ser. No. 635,989

Int. Cl.[2] B62D *55/24*

U.S. Cl. 180—5 R 15 Claims



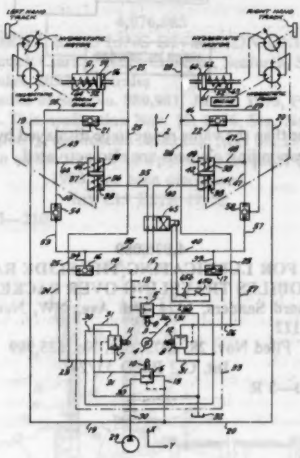
12. In a snowmobile including a frame with front and rear ends, a drive track comprising a plurality of endless belts of similar length having flat outer peripheral surfaces and positioned in side by side spaced relationship, a plurality of spaced cleats transversely crossing the outer peripheries of and joining said belts, and means mounting said track for movement relative to said frame comprising a plurality of parallel slide rails each being a longitudinal bar mounted on said frame, having front and rear ends respectively adjacent the front and rear ends of the frame, and slidably engaging and being supported by the inner surfaces of the cleats along the portion of said track disposed to support the snowmobile in the spacing between two of said adjacent belts, the improvement wherein said snowmobile comprises for each of said slide rails at least one tine having a terminal end portion adapted to engage packed snow, and means mounting the tine with said terminal end portion of the tine forceably engaging packed snow on which the snowmobile is supported and aligned between the front end of said frame and the front end of the slide rail so that when the snowmobile is moving forward the terminal end portion of said tine will fracture the packed snow and spray fragments of the packed snow through the openings between the belts and cleats of the drive track of the snowmobile and between the slide rail and drive track of the snowmobile adjacent the front end of the slide rail to provide lubrication and cooling therebetween.

4,076,090

DRIVE AND STEERING ARRANGEMENT FOR A VEHICLE WITH DIFFERENTIAL-SPEED STEERING

Alfred Krusche, Grossostheim, and Hans Dieter Drahtmüller, Obernau, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Mar. 12, 1976, Ser. No. 666,214
Claims priority, application Germany, Mar. 14, 1975, 2511176
Int. Cl.[2] B62D *11/04*
U.S. Cl. 180—6.48 16 Claims



1. In a differential-speed steering system for an automotive vehicle in which opposite sides of the vehicle are driven by respective hydrostatic transmissions each having a servomechanism shiftable from a neutral position to forward-drive and reverse-drive positions, four control-pressure transmitters are provided for actuation by a common control member, and the control-pressure transmitters are connected to said servomechanisms, said control member having a neutral position in which all four control-pressure transmitters are unaffected, said control-pressure transmitters being disposed symmetrically about said control member, the improvement wherein:

said control-pressure transmitters are disposed opposite one another in pairs including a first pair lying in a plane parallel to the longitudinal direction of the vehicle and a second pair lying in a plane transverse to said first plane;

said servomechanisms each include a servomotor having a piston defining a pair of oppositely effective pressurizable compartments adapted to be charged with fluid to displace the piston in a respective direction;

correspondingly effective compartments of both said servomotors are connected to a respective one of the control-pressure transmitters of said first pair for simultaneous pressurization of said correspondingly effective compartments, and

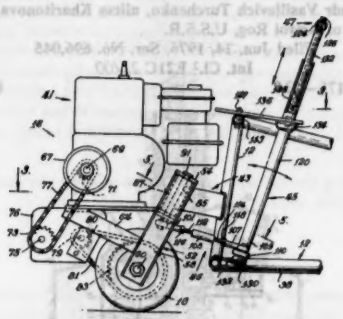
each of the control-pressure transmitters of said second pair is connected to the compartment opposite that energized by a transmitter of said first pair on the corresponding side of said vehicle to reduce the output speed of the hydrostatic transmission on said corresponding side of said vehicle to enable differential speed turning thereof.

4,076,091

SELF-PROPELLED VEHICLE

Larry G. Forster, Shoshoni, Wyo., assignor to Chair-E-Yacht, Inc., Shoshoni, Wyo.

Filed Mar. 30, 1976, Ser. No. 671,779
Int. Cl.[2] B62D *61/08*
U.S. Cl. 180—26 9 Claims



1. A vehicle, comprising:

a frame;

front and rear wheel assemblies mounted on said frame for supporting rollably said frame above the ground, said front wheel assembly being swingably mounted to the front portion of said frame;

drive means mounted on said front wheel assembly for driving said front wheel assembly to enable the vehicle to be propelled along the ground;

mounting means for attaching rotatably said front wheel assembly to said frame;

a steering column rotatably mounted on said frame;

bearing means for mounting said steering column in a backwardly inclined position;

bracket means connecting said bearing means to said frame for adjusting angularly positionally said steering column;

a linkage connecting said steering column and front wheel assembly for moving said front wheel assembly angularly in response to rotational movements of said steering column for steering purposes; and

wherein said bearing means including a pair of self-aligning bearings, one of said bearings surrounding the lower end portion of said steering column and fixed to said frame, the other one of said bearings being attached to said bracket means.

4,076,092

GRILLE MOUNTING APPARATUS

Leo J. Lorenz, Farmington, and Gary C. Stanek, Taylor, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

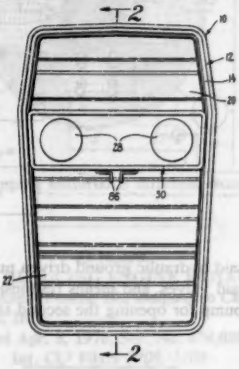
Filed Aug. 6, 1976, Ser. No. 712,290
Int. Cl.[2] B60K *11/04*
U.S. Cl. 180—68 P 8 Claims

1. A grille mounting apparatus in combination with a tractor adapted to be propelled in a forward direction, the tractor being provided with a grille and a grille frame assembly having an inwardly extending flange about an opening, the inwardly extending flange extending in a plane generally normal to the longitudinal axis of the tractor and having opposed portions extending towards each other across the opening: characterized by the grille mounting apparatus including:

support means interconnected with the tractor and operable to support the grille for movement between either a normal working position wherein the grille is disposed in juxtapositioned relationship with respect to the inwardly extending flange or a service position wherein the grille is disposed to one side of the normal working position of the

grille, the support means permitting the grille to be initially swung forwardly of the grille frame assembly and then to one side of the grille frame assembly as the grille is moved from its normal working position to its service position; and

fastening means engageable with the opposed portions of the inwardly extending flange and the grille and operable to maintain the grille in its normal operating position, the



fastening means being shiftable from a first position wherein it engages said opposed portions of the inwardly extending flange to a second position wherein the fastening means does not engage said opposed portions of the inwardly extending flange, and wherein the fastening means includes biasing means operable to insure that the grille is maintained in its juxtapositioned relationship with respect to the inwardly extending flange when the fastening means is in its first position.

4,076,093

BRAKING CONTROL APPARATUS FOR A VEHICLE

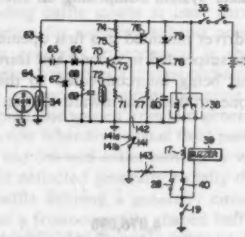
Akira Mizuno, Kariya, Japan, assignor to Goshi Kaisha Mizuno Kogeisha, Japan

Filed Oct. 4, 1976, Ser. No. 729,078

Claims priority, application Japan, Mar. 31, 1976, 51-35700; May 21, 1976, 51-59421; Jul. 1, 1976, 51-78010

Int. Cl.[2] B60T *7/02*

U.S. Cl. 180—82 R **10 Claims**



1. A braking control apparatus for a vehicle comprising:

an electromagnet and a locking plate attractable to said electromagnet, one of said electromagnet and said locking plate being fixedly attached to a vehicle and the other thereof being fixedly attached to a connecting rod responsive to the movement of a brake pedal of said vehicle, said electromagnet and said locking plate being slidable relative to each other in accordance with the amount of depression of said brake pedal when said electromagnet is deenergized, and said electromagnet attracting said locking plate to lock said brake pedal in any given depressed position of said brake pedal when said electromagnet is energized;

first brake pedal switch means inserted in an electric closed circuit including said electromagnet and a power source, said first brake pedal switch means being mounted to said vehicle and operable in response to the movement of said brake pedal so as to be closed when said brake pedal is depressed in excess of a predetermined amount;

amplifier means having switching means inserted in said electric closed circuit including said electromagnet and said power source;

second brake pedal switch means mounted to said vehicle to be operable in response to the movement of said brake pedal and electrically connected to said amplifier means, said second brake pedal switch means closing in response to the depression movement of said brake pedal to deenergize said switching means of said amplifier means, and said second brake pedal switch means opening in response to the backward movement of said brake pedal to disconnect said amplifier means with said second brake pedal switch means; and

accelerator pedal switch means mounted to said vehicle to be operable in response to the movement of an accelerator pedal of said vehicle and inserted in said electrically closed circuit including said electromagnet and said power source, said accelerator pedal switch means opening in response to the depression of said accelerator pedal.

4,076,094

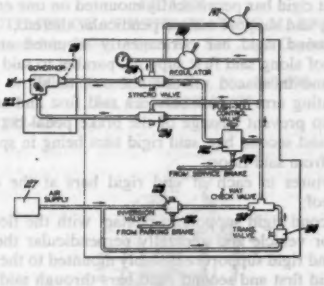
VEHICLE ENGINE SPEED CONTROL SYSTEM

Warren L. Moody, Milford, and Edward D. Baugh, Union Lake, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 19, 1976, Ser. No. 715,984

Int. Cl.[2] B60K *31/00*

U.S. Cl. 180—108 **8 Claims**



1. The combination in a vehicle engine speed control system of means for manually controlling fuel flow to said engine, a governor for shifting said manually controlled means in a fuel decreasing direction when said engine speed reaches a set maximum value, and the improvement comprising means for maintaining said engine speed at a desired value, said maintaining means including:

means for advancing said manually controlled means to a fuel flow position capable of producing engine speeds above said desired value in response to the application of fluid pressure; means for reducing said set maximum value of said governor to a value representing said desired value in response to the application of a variably controlled fluid pressure; and means for simultaneously actuating said advancing means and said reducing means, said actuating means including a source of fluid pressure, shutoff valve means connected to said fluid pressure source for selectively providing fluid pressure signals, first conduit means connecting said valve means to said advancing means whereby a first one of said fluid pressure signals actuates said advancing means, second conduit means connected to said valve means, and an adjustable regulator connected

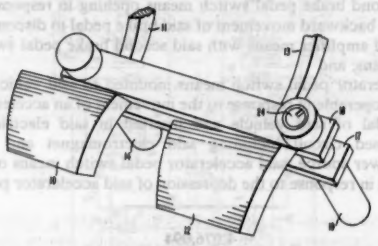
to said second conduit means for variably controlling a second one of said fluid pressure signals, said variably controlled fluid pressure signal actuating said reducing means, whereby said engine speed is automatically maintained at said desired value when said shutoff valve means provides said fluid pressure signals and said governor prevents said engine speed from exceeding said maximum value under manual control when said shutoff valve does not provide said fluid pressure signals.

4,076,095

PEDAL LOCKING DEVICE

Richard Adamski, 293 Yasemite Drive, Pittsburgh, Pa. 15235

Filed Sep. 3, 1976, Ser. No. 720,149
Int. Cl.² G05G *5/00*
U.S. Cl. 180—114 **3 Claims**



1. In a motor vehicle having a floor with operational pedals including a brake pedal with actuating arms proximate to said floor, the improvement comprising a removable locking device for at least one of said operational pedals comprised of:

a. a first rigid support in contact with the floor of the motor vehicle and generally perpendicular thereto;

b. a first rigid bar permanently mounted on one end thereof along said support and perpendicular thereto;

c. a second rigid bar permanently mounted at one end thereof along said first support, parallel to said first rigid bar and in spaced relation thereto, to allow the brake actuating arm to pass between said first and second bar and to prevent passage of the brake pedal between said first and second bar, said rigid bars being in spaced relation from said floor;

d. apertures in each of said rigid bars at the other end thereof;

e. a second rigid support in contact with the floor of said motor vehicle and generally perpendicular thereto, said second rigid support removably mounted to the other end of said first and second rigid bars through said apertures and said second support parallel to said first support; said first and second supports maintaining the position of said first and second bars to prevent downward travel of the brake pedal; and,

f. means for locking said second rigid support in said apertures in the first and second rigid bars.

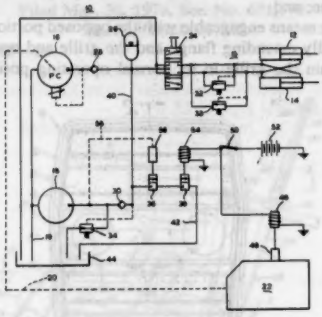
4,076,096

HYDRAULIC STEERING SYSTEM

Richard R. Hushower, Benton Harbor, and George M. Daresh, St. Joseph, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Nov. 24, 1976, Ser. No. 744,555
Int. Cl.² B62D *5/06*
U.S. Cl. 180—133 **5 Claims**

1. A steering system for a vehicle having a hydraulic steering mechanism, comprising a ground driven hydraulic pump which operates only when the vehicle is moving, a second hydraulic pump which operates independently of movement of the vehicle, an accumulator, means connecting each of said pumps to supply said accumulator, the accumulator being connected to supply pressurized hydraulic fluid to the steering mechanism, and two valves connected in series and arranged to discharge said accumulator and depressurize the steering system when both said valves are open, means responsive to



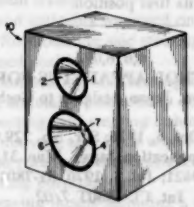
stoppage of said hydraulic ground driven pump for opening a first one of said valves, and means responsive to stoppage of said second pump for opening the second said valve.

4,076,097

AUGMENTED PASSIVE RADIATOR LOUDSPEAKER

Thomas Lowe Clarke, 12110 SW. 108 St., Miami, Fla. 33186

Filed Aug. 4, 1976, Ser. No. 711,570
Int. Cl.² H04R *1/02*
U.S. Cl. 181—147 **3 Claims**



1. A loudspeaker system comprising an enclosed chamber having

an energized driver mounted in a first opening,

two diaphrams suspended in second and third openings,

said diaphrams being interconnected so that an outward motion of one produces an inward motion of the other.

4,076,098

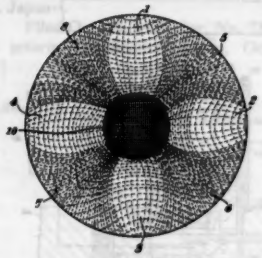
LOUDSPEAKER DIAPHRAGM

Dennis Charles Ward, Brighton, England, assignor to B & W Loudspeakers Limited, England

Filed Mar. 15, 1976, Ser. No. 666,616
Claims priority, application United Kingdom, Mar. 15, 1975, 10888/75
Int. Cl.² D10K *13/00*; H04R *7/00*; D06N *3/18*
U.S. Cl. 181—170 **10 Claims**

1. A loudspeaker diaphragm comprising: (a) a textile material having spaces between adjacent threads, (b) an impregnant stiffening material for stiffening the threads and which does not completely fill the spaces between the threads of the textile material, the impregnant comprising a first synthetic resin, and

(c) a damping material at least partially filling the spaces, the damping material comprising a second synthetic resin, and



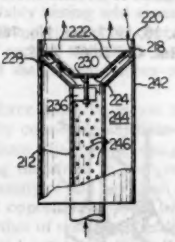
wherein said damping material is different from said impregnant.

4,076,099

DEVICE FOR REDUCING ENGINE EXHAUST NOISE

Frederick D. Proksch, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 5, 1976, Ser. No. 674,030
Int. Cl.² F01N *1/08, 1/00*
U.S. Cl. 181—264 2 Claims



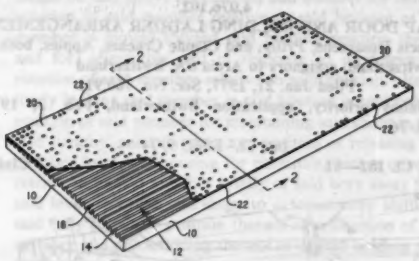
1. A device for reducing exhaust noise comprising: an exhaust pipe having inlet and outlet portions separated by an intermediate transition portion, said inlet and outlet portions being generally tubular and defining inlet and outlet diameters, said outlet diameter being greater than said inlet diameter, and further including baffle means at least partially within said transition portion for reducing exhaust noise, said transition portion being generally frustoconical in shape and wherein said baffle means comprises a correspondingly frustoconically shaped baffle, and mounting means mounting said baffle within said exhaust pipe, and spaced from said generally frustoconical transition portion whereby exhaust fluid passing through said inlet portion and out said outlet portion by way of said transition portion is deflected generally radially outwardly by said baffle, said baffle defining a generally circular forward end wall joined to a frustoconically shaped baffle side wall, said frustoconically shaped baffle side wall being in spaced parallel relation to said frustoconically shaped transition portion, and further including vent means in said frustoconical transition portion and said baffle sidewall fluidly intercommunicating the exterior thereof with the interior of said baffle, said vent means comprising openings in said baffle sidewall and said transition portion, and generally elongated, hollow vents defining walls at least partially supporting said baffle and shaped so as to have a semi-circular lead portion and an elongated tail portion along opposite sides thereof, said lead portion being oriented toward said inlet and said tail portion being oriented toward said outlet so as to facilitate exhaust flow therearound, and wherein said hollow vents are of integral, one-piece construction with said frustoconical transition portion and said frustoconically shaped baffle so as to produce a unitary device.

4,076,100

OIL IMPERVIOUS ACOUSTICAL BOARD

George G. Davis, Cos Cob, Conn., assignor to Frigitemp, New York, N.Y.

Continuation-in-part of Ser. No. 497,952, Aug. 16, 1974, Pat. No. 3,991,848. This application Oct. 7, 1976, Ser. No. 730,323
Int. Cl.² E04B *1/99*
U.S. Cl. 181—290 2 Claims



1. An acoustical facing material comprising a melamine board, including a plurality of longitudinal ribs on one side thereof, having grooves between each pair of ribs; an impervious thin film covering the ribbed side of said board; and a fabric covering material covering said impervious film, said fabric material being perforated with perforations intermediate said ribs.

4,076,101

UTILITY COAT WITH SEATING HARNESS

Lew Himmelrich, 32742 Alipaz St., San Juan Capistrano, Calif. 92675

Filed Nov. 9, 1976, Ser. No. 740,096
Int. Cl.² A62B *35/00*
U.S. Cl. 182—3 7 Claims

1. A utility coat, comprising, in combination:

a tubular body portion with a lower edge, engageable about the torso and upper portions of a wearer's legs and including a rear panel and front panels having front edges which define a vertically-extending front opening;

an elongate, flexible belt fixed to the outside of said body portion to occur adjacent the midriff of the wearer's body and having free end portions carrying fastening means which extend to adjacent the front opening;

a pair of elongate, flexible crotch straps within the body portion having rear ends fixed to the belt at the rear panel

in laterally spaced-apart relationship, and forward ends with belt-coupling means, and

means for releasably securing the forward ends of the crotch straps within the body portion adjacent the rear panel in a folded relationship, the forward ends of said crotch straps being shiftable from the folded position, forwardly between a wearers legs, through the front opening, and into coupling engagement with the free end portions of the belt.

4,076,102

TRAP DOOR AND FOLDING LADDER ARRANGEMENT

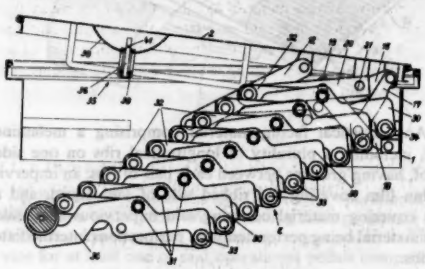
Francis Desarzens, Prilly, and Claude Cruchet, Apples, both of Switzerland, assignors to Arcia SA, Switzerland

Filed Jan. 21, 1977, Ser. No. 760,911

Claims priority, application Switzerland, Feb. 3, 1976, 1328/76

Int. Cl.[2] E06C 9/14

U.S. Cl. 182—81 3 Claims



1. A trap door and folding ladder arrangement comprising a casing able to receive the ladder folded in a storage position, the ladder comprising two uprights composed of rung-supporting pieces and intermediate pieces pivotally connected to one another to form an extensible folding structure, and a cover connected to the casing and to each upright of the ladder by a system of levers and connecting rods whereby the ladder when unfolding automatically actuates raising of the cover then moving it forward by a slight distance to free a rear edge of the cover from a corresponding side of the casing, and finally complete opening of the cover when the ladder is completely unfolded.

4,076,103

LUBRICATING MEANS FOR GAS-OPERATED CYLINDERS

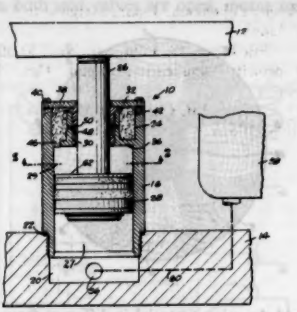
Bernard J. Wallis, 25200 Trowbridge Ave., Dearborn, Mich. 48124

Filed Sep. 13, 1976, Ser. No. 722,863

Int. Cl.[2] F16N 1/00

U.S. Cl. 184—25 10 Claims

1. In combination, a cylinder, a piston in said cylinder dividing the cylinder into a working chamber and an idle chamber which vary inversely in size in response to reciprocation of the piston within the cylinder, said cylinder having an end wall defining one end of the idle chamber, the other end of the idle chamber being defined by the back face of the piston, means for introducing gas under pressure to the working chamber for displacing the piston to a position adjacent said end wall, means on said cylinder defining a lubricant chamber, lubricant-impregnated wick means in said lubricant chamber, passageway means extending between said lubricant chamber and said idle chamber, said wick means having a portion thereof extending through said passageway means into said idle chamber at a location axially adjacent said end wall, whereby, when the piston is displaced to a position axially adjacent said end wall,



it is contacted by said wick means so as to apply lubricant thereto.

4,076,104

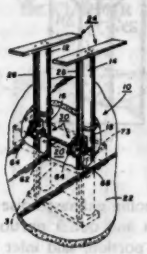
SAFETY LATCH FOR AUTOMOTIVE HOISTS

Burton DeWolfe Bishop, and Lawrence E. Murray, both of Salisbury, Md., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Feb. 18, 1977, Ser. No. 769,972

Int. Cl.[2] B66F 7/28

U.S. Cl. 187—8.5 12 Claims



1. In an automotive hoist including a hoisting mechanism, the combination of an automatically operable safety latch comprising in combination:

a. a vertical member defining a lateral recess in a vertically extending surface thereof;

b. a pawl shaft extending transversely of said member and having a lateral slot defined at a location between its ends inwardly receiving the recess containing surface of said member for straddling the member thereat, said pawl shaft being supported for limited rotation and adapted to cooperate with said member recess to effect an interlocking latching relation of the hoisting mechanism;

c. bias means rotationally biasing said pawl shaft from a cocked relation toward said latching relation;

d. one of said pawl shaft or said member being vertically fixed in place and the other of said pawl shaft or said member being attached to the hoisting mechanism for vertical movement in conjunction with the raising and lowering of said hoist mechanism whereby said pawl shaft will effect said latching relation at a predetermined elevated position of said hoisting mechanism; and

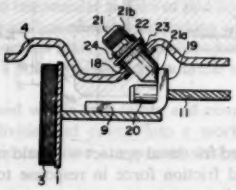
e. release means manually operable in opposition to said bias means to disengage said latching relation and enable lowering of said hoisting mechanism.

4,076,105

LEVER STRAP FOR A DRUM BRAKE

Masami Aono, Yokohama, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Oct. 18, 1976, Ser. No. 733,307
Claims priority, application Japan, Oct. 20, 1975, 50-142740[U]
Int. Cl.[2] F16D 65/22
U.S. Cl. 188—106 A 4 Claims



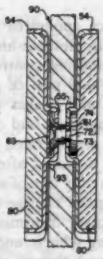
1. In a drum brake of the type having
a rotatable drum to be braked;
a non-rotatable backing plate;
a pair of concavely opposed, arcuate brake shoes shiftably mounted upon said backing plate and carrying friction linings thereon within said drum disposed for brakingly engaging the latter when said shoes are shifted outwardly away from each other;
means for yieldably biasing said shoes toward each other;
first brake force applying means operably coupled with one extremity of each of said shoes for moving said one extremities and thereby said shoes outwardly away from each other;
second brake force applying means including an elongate lever pivotally connected adjacent one end thereof with one of said shoes adjacent said one extremity of the latter and extending therefrom in the general direction of the opposite extremity of said one shoe, strut means extending between and oppositely coupled with intermediate portions of the other of said shoes and said lever to provide a fulcrum for the latter intermediate its ends, and means operably coupled with said lever adjacent the opposite end thereof for applying a force to the latter to swing the same inwardly to rock said lever upon said fulcrum and move said one end of said lever and thereby said one extremity of said one shoe outwardly away from said other shoe; and
a hole in said backing plate facing a part of said lever adjacent said opposite end of the latter;
the improvement of which brake comprises improved and reusable stop means for releasably holding said shoes in a standby, partially retracted position between the fully inwardly retracted position they would otherwise assume under the influence of said biasing means and their outwardly shifted braking position and for automatically causing said shoes to shift to said fully retracted position thereof to facilitate access to said linings for maintenance purposes when said stop means are placed in a releasing condition thereof, said improved stop means including:
a housing mounted on said backing plate in adjacent but spaced relationship to said part of said lever and having a sleeve portion extending outwardly from said backing plate in a direction away from said part of said lever,
said sleeve portion being provided with a cylindrical bore extending therethrough, communicating with said opening in said backing plate, having its inner extremity spaced from said part of said lever, and having its axis in alignment with said part of said lever;
an elongate stop member of greater length than said bore having a generally cylindrical stretch of lesser diameter than said bore slideably and rotatably receivable within the latter for free rotation of said member relative to said sleeve portion and free axial movement of said stretch selectively inwardly into and through and outwardly out of said bore,
said member having a holding position in which the inner extremity thereof is disposed inwardly of said inner extremity of said bore for engaging said part of said lever to hold the latter in said standby, partially retracted position thereof while an outer portion of said member is disposed outwardly of said backing plate and accessible for manipulation to move said member rotationally and axially relative to said housing; and
cooperating, rotationally lockable and releasable, fastening means on said sleeve portion and said member for limiting rotation of said member relative to said housing as said member is moved toward said holding position thereof and for, selectively and in response to predetermined rotation of said member relative to said housing, alternatively locking said member in said housing in said holding position of said member for maintaining said shoes in their said standby, partially retracted position or releasing said member from said housing for permitting either outward retraction of said member axially of said bore away from said lever to cause said shoes to automatically shift into said fully retracted position thereof of reinsertion of said member and repositioning thereof in its said holding position within said housing.

4,076,106

SNAP FASTENERS FOR BRAKE DISK WEAR PLATES

Peter D. Bermingham, Mogadore, and Robert W. Chin, Akron, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 19, 1976, Ser. No. 733,732
Int. Cl.[2] F16D 69/04
U.S. Cl. 188—250 G 1 Claim



1. Releasably connected brake disk wear plates, comprising:
a first brake disk wear plate, said first plate having a top portion and a wear pad therein,
said top portion of said first wear plate having a button formed therein,
a projection fastener having a base plate positioned in said button,
a shaft attached to said base plate and having an enlarged ball shaped end with said shaft and ball shaped end extending through an aperture in said button,
a core plate having an aperture therein, said first wear plate engaging said core plate on one side thereof with said button and projection fastener extending into said core aperture,
a second brake disk wear plate, said second plate having a top portion and a wear pad therein,
said top portion of said second wear plate having a button formed therein,
a resilient female prong fastener, said prong fastener including a base plate positioned in said button of said second wear plate and a number of sections attached to said prong fastener base plate with the end portions of said sections

extending through an aperture in said button of said second wear plate,

said second wear plate engaging the opposite side of said core plate than said first wear plate with said second wear plate button and said prong fastener extending into said core aperture,

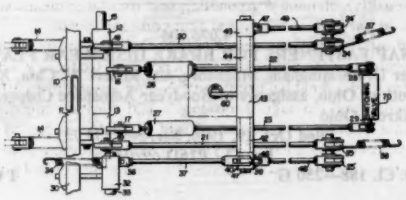
said sections of said prong fastener releasably and matingly engaging said ball shaped end of said projection fastener and said end portions are free to move radially of said ball shaped end to engage and disengage the same so that said first and said second wear plates are releasably engaged to said core plate, said buttons having adjacent opposed surfaces spaced from each other, said end portions of said sections and said ball shaped end having engaging surfaces positioned in the area between the opposed faces of said buttons.

4,076,107

VEHICLE CLUTCH BRAKE STEERING CONTROLS WITH TRANSMISSION NEUTRALIZER

Kazuo Yasoshima, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Feb. 3, 1976, Ser. No. 654,780
Int. Cl.² F16D *67/02*; B60K *29/00*
U.S. Cl. 192—4 A **7 Claims**



1. A steering control apparatus for a vehicle of the type having a pair of steering clutches and a pair of steering brakes comprising a pair of steering control means, first connecting means for connecting said pair of steering control means to said steering clutches and brakes such that said brakes are actuated without disengaging said clutches when said pair of steering control means are operated simultaneously, and one of said steering brakes is actuated after disengaging one of said steering clutches when only one of said pair of steering control means is operated, a speed change control means for a speed change gear clutch, power transmission gear means for transmitting power to driving wheels, and second connecting means for connecting said speed change control means to said steering brakes and said power transmission gear means such that said steering brakes are actuated after disengagement of said power transmission gear means when said speed change control means is operated.

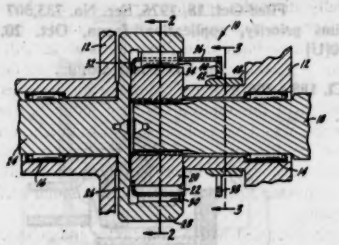
4,076,108

TWO-WAY OVERRUNNING CLUTCH MECHANISM

Mark John Fogelberg, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 5, 1976, Ser. No. 712,122
Int. Cl.² F16D *15/00, 41/06*
U.S. Cl. 192—35 **6 Claims**

1. In a two-way engaging device including first and second rotatable members, one of said rotatable members defining an inner race and the other of said rotatable members defining an outer race, wedging means disposed between said inner and outer races for selectively providing a wedgingly engaged drive between said rotatable members in either a clockwise or counterclockwise direction, a stationary member, and biasing means for said wedging means; the improvement wherein said biasing means comprises drive means engaged with said wedging means, said drive means defining a drive element having a plurality of lugs, and a plurality of spring clips each engaged with a respective lug by a lost motion connection, said spring clips frictionally contacting said stationary element with a friction force of predetermined magnitude, said spring clips



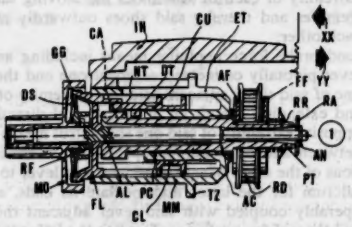
yielding toward frictional contact with said stationary member at a decreased friction force in response to rotation of said rotatable members.

4,076,109

DUAL FRICTION CLUTCH FOR MOTION-PICTURE PROJECTORS

Roberto Bencini, Dr.Ing. Misitano A.G. via Padova, 217, 20127 Milan, Italy

Filed Sep. 5, 1975, Ser. No. 610,789
Claims priority, application Italy, Sep. 25, 1974, 27672/74
Int. Cl.² F16D *47/00, 7/02*
U.S. Cl. 192—48.4 **7 Claims**



1. A dual friction clutch for motion-picture projectors comprising spindle means for carrying a film spool, a stationary frame, a hollow spindle coaxial about the spindle means, a stationary sleeve having an inside tubular section and an outside tubular section, the outside tubular section being fixed to the stationary frame and a toothed drive wheel mounted around said hollow spindle, a weak friction clutch and a strong friction clutch mounted coaxially on said spindle means at opposite ends thereof and a selector device comprising a slider rotatably mounted about the said inside section of the tubular sleeve and movable parallel to the axis of said spindle means between a first position wherein both clutches are unclutched, a second position wherein the spindle means is subject only to the weak friction clutch and a third position wherein the spindle means is subject to the strong friction clutch.

4,076,110

QUICK DISENGAGEMENT VISCOUS DRIVE COUPLING

Thomas H. Tinholt, Marshall, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 13, 1976, Ser. No. 722,907
Int. Cl.² F16D *35/00*
U.S. Cl. 192—58 B **8 Claims**

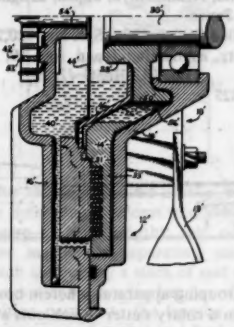
1. A viscous drive coupling comprising:

(a) a housing defining an annular cavity bounded by a pair of generally radially extending axially disposed annular surfaces;

(b) a shaft rotatably supported by said housing and partially located within said cavity;

(c) an annular rotor secured to said shaft within said cavity, said rotor having a pair of generally radially extending axially disposed annular surfaces, one of said annular surfaces on said rotor having a radially inner portion disposed no more than fifty thousands (0.050) of an inch from a portion of one of said annular surfaces of said housing and a radially outer portion disposed no more than forty thousands (0.040) of an inch from another portion of said one annular surface of said housing, and the other annular surface of said rotor having a radially outer portion disposed no more than thirty thousands (0.030) of an inch from a portion of the other annular surface of said housing;

(d) a plate located within said cavity and connected to said housing to divide said cavity into a working chamber containing said rotor and a reservoir, said plate having a



generally radially extending annular surface disposed no more than seventy thousands (0.070) of an inch from a radially inner portion of said other annular surface of said rotor;

(e) fluid disposed in said cavity and positionable between said annular surfaces to transmit energy through said fluid from either said housing or said rotor respectively to said rotor or said housing;

(f) valve means effecting selective fluid flow communication between said reservoir and said working chamber;

(g) means for controlling said valve means;

(h) means defining a discharge opening for fluid flow communication between said working chamber and said reservoir; and

(i) pump means carried by either said housing or said rotor to pump fluid from said working chamber during rotation of said housing and said rotor through said discharge opening to said reservoir.

4,076,111

REGISTRATION MEANS FOR PRINTERS AND THE LIKE

Prentice I. Robinson, Pelham, and Thomas T. Butterfield, Chester, both of N.H., assignors to Centronics Data Computer Corporation, Hudson, N.H.

Filed Jul. 8, 1976, Ser. No. 703,623
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R **17 Claims**

1. Apparatus for electronically controlling the printing of a line of N dot patterns and the like on a paper document to assure proper registration of the dot patterns comprising:

a movable carriage;

a print head assembly mounted upon said carriage and including print control means for producing dot patterns;

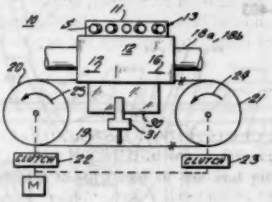
means for moving the carriage across the paper document between the margins of said paper document at a substantially constant speed during printing;

a light source and a light sensing element arranged in spaced fashion near one of said margins;

a flag mounted upon said carriage and movable between said light source and said light sensing element to selectively interrupt light from said source from reaching said light sensitive element when positioned therebetween;

gated oscillator means;

means normally disabling said gated oscillator means and responsive to activation of said carriage moving means



and said light sensitive element when said flag moves out of the region between said light source and said light sensitive element for enabling said oscillator means when said carriage is moving at said constant speed;

said oscillator means comprising R-C timing means for generating print control pulses at a constant frequency, which frequency enables printing of N equi-spaced dot patterns when said carriage is moving at said constant speed;

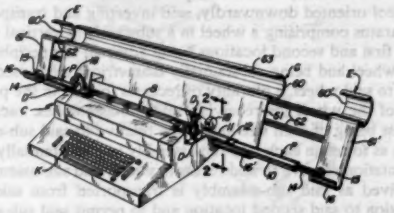
means coupling the output of said oscillator means to said print control means for enabling said print control means at spaced intervals determined by said print control pulses.

4,076,112

FREE PLATEN TYPEWRITER

Cecil S. Effinger, 828 Pearl St., Boulder, Colo. 80302

Filed Apr. 30, 1976, Ser. No. 681,822
Int. Cl.² B41J *13/03, 11/04*
U.S. Cl. 197—127 R **14 Claims**



12. A free platen typewriter having means for supporting said platen at points a predetermined distance apart and means for imprinting characters at selected positions on a sheet extending around said platen, said platen having free ends, being movable to different endwise positions, receiving a sheet extending around the same having a width greater than the length of said platen and including:

a tube having a length greater than said predetermined distance;

a covering of an elastomer extending on said tube for a length greater than said predetermined distance;

tubular end extensions slidable within said tube from the opposite ends thereof and adapted to receive a sheet extending around both of said extensions, when fully extended, and wider than the combined length of said platen and the fully extended extensions;

a weight disposed within said tube and extending longitudinally thereof, said weight being cylindrical and having an

outer diameter less than the inner diameter of said platen tube; and

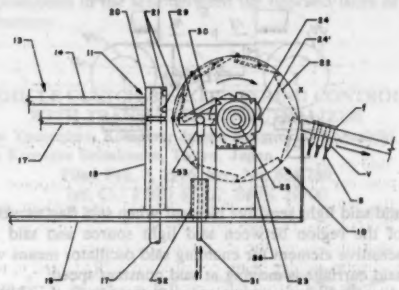
said tubular end extensions surrounding and being slidable along said weight between said weight and the elastomer covered portion of said tube.

4,076,113

APPARATUS FOR SIMULTANEOUSLY REORIENTING AND TRANSPORTING ARTICLES

Walter A. Shields, 181-41 Henley Road, Jamaica, N.Y. 11432

Filed Nov. 24, 1976, Ser. No. 744,482
Int. Cl.[2] B65G *47/24*
U.S. Cl. 198—403 **1 Claim**



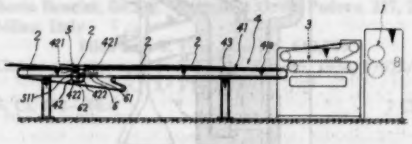
1. The combination of apparatus for simultaneously inverting and transporting from a first location to a second location syringe sub-assemblies including syringe vials having hypodermic needles secured to one end thereof, the vial of each of said syringe sub-assemblies having an external annular flange at the end thereof opposite the needle, said flange being downwardly oriented at said first location, and apparatus for washing said sub-assemblies while said sub-assemblies are retained substantially vertically with said flanges oriented downwardly, said washing apparatus including a turret rotatable in a substantially horizontal plane and having substantially vertical notches in the periphery thereof each for retaining a respective said sub-assembly substantially vertically with said flange thereof oriented downwardly, said inverting and transporting apparatus comprising a wheel in a substantially vertical plane, said first and second locations being adjacent the periphery of the wheel and being substantially diametrically opposed relative to said wheel, a plurality of recesses formed in the periphery of the wheel for receiving said sub-assemblies, each said recess being of such size and shape relative to said sub-assemblies as to retain each said sub-assembly in a substantially fixed orientation relative to said recess in which said sub-assembly is received as said sub-assembly is transported from said first location to said second location and to permit said sub-assembly to discharge by gravity from the recess into the receiving means at said second location, means for consecutively rotationally indexing the wheel thereby to bring consecutive said recesses into substantial registry with said first location, said indexing means comprising a ratchet wheel secured to said recess-containing wheel and a driven ratchet pawl operatively associated with the ratchet wheel, means for striking each said syringe sub-assembly with force sufficient to carry the sub-assembly from the first location into a respective said recess in substantial registry with the first location but insufficient to cause damage to said sub-assembly or to cause said sub-assembly to rebound out of said recess receiving said sub-assembly, the path of movement of each of said notches of said washing apparatus turret bringing said sub-assemblies consecutively into juxtaposition with said striking means at said second location for striking by said striking means and propelling thereby into a respective said recess of said wheel, and means for receiving said articles from said recesses at said second location, said receiving means comprising a pair of parallel rails having a spacing therebetween greater than the largest diameter of the vials except for said flange thereof and less than the diameter of said flange whereby the flanges of the vials rest on the rails thereby to support the sub-assemblies and retain the sub-assemblies in an orientation inverted relative to the orientation of the sub-assemblies at the first location, said rails being inclined downwardly in a direction away from said wheel sufficiently to assist gravity transport of said sub-assemblies away from said wheel.

4,076,114

BOARD GROUPING APPARATUS

Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Co., Ltd., Osaka, Japan

Filed Sep. 3, 1976, Ser. No. 720,234
Claims priority, application Japan, Apr. 19, 1976, 51-45135
Int. Cl.[2] B65G *47/29*
U.S. Cl. 198—425 **3 Claims**



1. A board grouping apparatus wherein boards successively discharged from a rotary cutter which cuts a web of material such as a corrugated web, and continuously, transversely feeds said boards of a suitable length onto a conveyor to group the boards in any suitable number of sheets, said apparatus comprising:

a board transporting belt conveyor;

a detour portion wherein the transporting surface of the belt of said conveyor passes through a substantially U-shaped path;

said substantially U-shaped path of said detour portion includes a first upper guide roll, a first lower guide roll, a second lower guide roll being parallel to the first lower guide roll and a second upper guide roll mounted above said second lower guide roll;

a stopper comprising first and second members;

said first member of said stopper being fixed to a rotatable transverse shaft arranged within said detour portion of said transporting belt conveyor; said first member of said stopper being movable to protrude above a transportation plane of said transporting belt conveyor from within said detour portion of said transporting belt conveyor by the rotation of said transverse shaft;

said first member of said stopper assumes a substantially horizontal posture in the fully protruded position;

said second member of said stopper being joined to said first member so as to be inclined relative to said first member of said stopper in a direction opposite to a feed direction of said transporting belt conveyor;

said second member of said stopper substantially protrudes above the transportation plane of said transporting belt conveyor when said first member of said stopper protrudes above the transportation plane;

said second member of said stopper includes a portion which is within said detour portion when said first member of said stopper protrudes above the transportation plane of said transporting belt conveyor; and

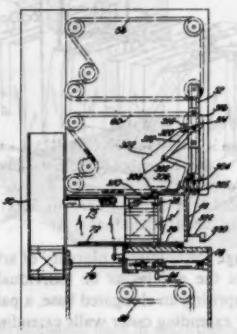
means for rotating said transverse shaft.

4,076,115

APPARATUS FOR HANDLING ROD-LIKE ARTICLES

Robert Thomas Daisley, and David Charles Philip Chumley, both of London, England, assignors to Molins Limited, England

Filed Apr. 26, 1976, Ser. No. 680,224
Claims priority, application United Kingdom, Apr. 25, 1975, 17161/75
Int. Cl.[2] B65G 47/00, 45/00
U.S. Cl. 198—487 17 Claims



1. Apparatus for handling rod-like articles, comprising conveyor means for delivering a stream of rod-like articles in a direction transverse to their lengths, said conveyor means including divider means for separating said stream into batches, each batch comprising a stack of said articles, pusher means including a pusher for moving batches off said conveyor means in a direction parallel to the lengths of said articles, drive means for moving said pusher in a feed stroke, locating means arranged to move with the pusher and adapted to exert light pressure on the upper surface of the batch during said feed stroke, means responsive to said drive means for moving said locating means relative to said pusher from a primed position in which it is spaced above said stack downwardly into its operative position in contact with the top of a batch adjacent one longitudinal edge thereof as said pusher moves through a feed stroke, at least a part of said locating means being movable independently of said moving means to accommodate changes in the level of said upper surface, and means for supporting a container in a position to receive a batch from said pusher so that at the end of a feed stroke the locating means extends into the container and continues to exert light pressure on the upper surface of the batch.

11. Apparatus for handling rod-like articles, comprising a pusher for moving a batch comprising a stack of rod-like articles in a direction parallel to the lengths of the articles, means for moving said pusher in a feed stroke, locating means arranged to move with the pusher and adapted to exert light pressure on the upper surface of the batch during said feed stroke, and a brush member attached to the rear surface of said pusher and positioned to sweep particles from a surface over which a batch is moved by said pusher.

4,076,116

KA-BOB DISPLAY

Roger E. Sowders, 7322 Elm Court, Wichita, Kans. 67206

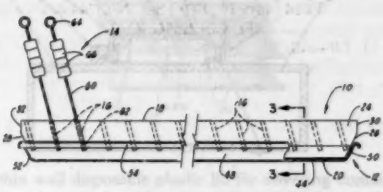
Filed Aug. 4, 1975, Ser. No. 601,527
Int. Cl.[2] B65D 1/34
U.S. Cl. 206—45.19 1 Claim

1. A meat display holder, the holder comprising:

a tray having an open top portion, a flat bottom portion, side portions, and end portions, the side portions and end portions of said tray angled upwardly and outwardly from the flat bottom portion of said tray;

a holder mounted in said tray, said holder having a flat top portion, a flat bottom portion disposed on top of the bottom portion of said tray, side portions, and end portions, the side portions and end portions of said holder angled upwardly and outwardly and received in a snug fit against the angled side portions and end portions of said tray when the holder is mounted thereon, said holder extending upwardly from the open top portion of said tray;

a plurality of apertures in the top portion of said holder, said apertures arranged in rows in the top portion of said holder and parallel to the length of said holder, said apertures inclined toward one of the end portions of said holder; and



a plurality of upwardly extending recesses disposed along the length of said holder and in the bottom portion thereof, said recesses parallel and adjacent the rows of said apertures along the length of said holder;

the display holder being constructed and adapted in use for placing in a refrigerated meat display case or the like and having food product ladened ka-bob skewers slidably received in said plurality of apertures.

4,076,117

SAFETY MATCH BOX

Trevor C. Wisdom, 14 University Place, Glen Head, N.Y. 11545, and Leroy J. Wisdom, 148 Fifth Acre Road South, Smithtown, N.Y. 11787

Filed Jul. 21, 1976, Ser. No. 707,438
Int. Cl.[2] A24F 27/00; B65D 13/06
U.S. Cl. 206—106 7 Claims

1. A safety match box comprising:

a cover having upper and lower surfaces and side walls joining said surfaces, said side walls being recessed at one end from the edge of the upper and lower surfaces, and having locking means protruding inwardly at said ends, and,

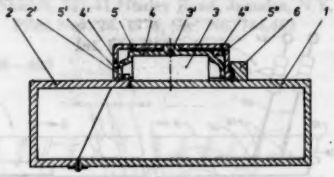
a tray which is slideable within the cover comprising a base and connecting side walls and end walls joined thereto forming a recessed container wherein one of said end walls comprises a striker and the opposite end wall comprises a segmented flexible wall to permit withdrawal from the locking means to permit movement of the tray, and wherein the side walls each include a recessed portion normally engaged by the locking means when the tray is in a closed condition and a protruding portion adjacent the striker end to engage the locking means and prevent the tray from being completely withdrawn from the cover.

4,076,118

DEVICE FOR LIMITING THE CONSUMPTION OF OBJECTS IN A CONTAINER

Jack Karlsson, Elvabovagen 30, 230 12 Hollviksnas, Sweden

Filed Jun. 1, 1977, Ser. No. 802,556
Claims priority, application Sweden, Jun. 14, 1976, 7606719
Int. Cl.[2] B65D *85/10*
U.S. Cl. 206—268 3 Claims



1. A container assembly including a timed lock apparatus, comprising in combination, a container having a openable cover, a presettable manually wound timer mounted on a wall of said container of the type that is wound by rotation of a shaft in one direction and which rotates in the opposite direction to a limit position for a time period which is a function of the degree of shaft rotation in the winding direction having a rotatable member operated by a timing mechanism thereof with a notch in said member movable to a registry position at said limit position after a time preset on said timer, a locking member movable with said cover into said registry position when the cover is closed and retained by said rotatable member to lock the cover closed except when said notch is presented in said registry position, and a protecting cap which control said timings mechanism by rotating said shaft only in said wound direction to set a further time period thereon, whereby the reduction of a preset time by manual access to said shaft is prevented by said protecting cap.

4,076,119

PACKAGING TRAY FOR A VIDEODISC

John William Clarke, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 4, 1976, Ser. No. 663,656
Int. Cl.[2] B65D *85/30, 85/02*
U.S. Cl. 206—309 7 Claims

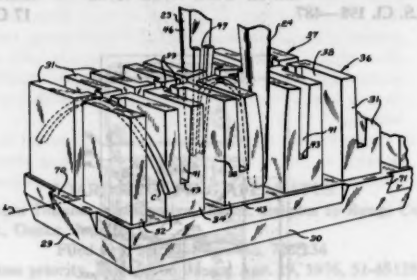
1. A packaging tray for an entertainment disc having at least two elongated apertures in its central unrecorded portion comprising: an integral disc platform having a wall extending upwardly therefrom defining a cavity for closely receiving the disc, a raised central pedestal extending from said cavity in supporting contact with an unrecorded central portion of the disc, upright retaining posts extending from said pedestal and positioned to extend through and adjacent the ends of the disc apertures, and recessed areas in said pedestal underlying the disc apertures.

4,076,120

CARTRIDGE FOR HOLDING HEMOSTATIC CLIPS

Ronald L. Carroll, Evanston, and John S. Ziegler, Arlington Heights, both of Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Dec. 10, 1976, Ser. No. 749,292
Int. Cl.[2] B65D *85/54*
U.S. Cl. 206—339 10 Claims



1. A cartridge for holding a plurality of articles in a manner which permits the articles to be individually removed, the cartridge comprising an elongated base, a pair of spaced-apart longitudinally extending outer walls extending upwardly from the base, a plurality of sets of inner walls extending upwardly from the base between transversely to the spaced-apart outer walls, each of the sets of inner walls including a pair of holding walls which are spaced apart in the longitudinal direction of the base and which provide a compartment for receiving one of said articles, the longitudinal spacing between the holding walls being such that the article is frictionally retained between the holding walls, and means for supporting the article within the compartment, each of the holding walls being formed of flexible material and being flexible away from each other when an article is removed from a compartment by inserting an instrument between the holding walls of the compartment and over the article, the instrument bearing upon the walls so as to force the walls apart and release their grip upon the article, thereby allowing the article to be removed without resistance.

4,076,121

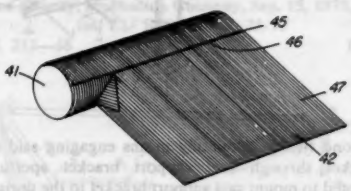
REINFORCED THIN WALL PLASTIC BAG, AND METHOD AND APPARATUS TO MAKE MATERIAL FOR SUCH BAGS

William J. Clayton, Fairport; Robert H. Olson, Pittsford, and Donald F. Kutniewski, Macedon, all of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 406,423, Oct. 15, 1973, Pat. No. 3,984,047, which is a continuation-in-part of Ser. No. 383,027, Jul. 26, 1973, abandoned. This application Feb. 17, 1976, Ser. No. 658,561
Int. Cl.[2] B32B *1/08, 3/30;* B65D *65/28, 85/70*
U.S. Cl. 206—390 3 Claims

1. A continuous roll of thermoplastic bags, said bags having been fabricated from a film of low density polyethylene material having a wall thickness on the order of about 0.02 to 0.05 mm and spaced, peaked ribs integral with the film being formed in the film and having a rib-to-rib spacing on the order of ¼ cm to 2 cm, said ribs merging smoothly from a projecting peak to the thickness of the walls between the ribs, each individual bag being joined in side-by-side relationship by a transversely positioned heat seal line and having a transversely disposed weakened area in the area of said heat seal line

whereby removal of a bag from said roll is effected by tearing along said weakened area.



2. A roll of thermoplastic bags in accordance with claim 1, having a weakened area within the confines of said heat seal line.

4,076,122

PACKAGE OF BAGS

Stanley Darwin Hall, Taylors, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Filed Oct. 26, 1976, Ser. No. 735,709
Int. Cl.² B65D *73/00*
U.S. Cl. 206—460 **10 Claims**

1. In a chain of bags wherein each bag has an open end and a closed end and sides extending between said open end and said closed end and wherein a plurality of bags are connected together in an imbricated arrangement by a first carrier removably secured to the bags on one side of each of the bags adjacent the open end thereof, the improvement comprising:

a second carrier removably secured to each of the bags on the other side of the bags adjacent the closed end thereof.

8. In a method of assemblying a chain of imbricated bags wherein each bag has an open end and a closed end and sides extending between said open end and said closed end and a first carrier is removably secured to one side of said chain of imbricated bags adjacent the open end of each of said bags, the improvement comprising:

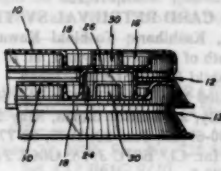
securing a removable second carrier on the opposite side of said chain of imbricated bags adjacent the closed end thereof.

4,076,123

DISPOSABLE PLASTIC LID

Paul Davis, Swampscott, Mass., assignor to Sweetheart Plastics, Inc., Wilmington, Mass.

Filed Jun. 17, 1976, Ser. No. 696,935
Int. Cl.² B65D *21/00, 85/62*
U.S. Cl. 206—503 **4 Claims**



1. A thin wall disposable plastic lid for covering containers and designed to stack with other substantially identical lids without compacting comprising

a circular closure wall and a surrounding downwardly extending skirt,

a recess formed about the closure wall by downwardly depending generally encircling walls and a recess bottom,

a pair of upwardly extending and closely spaced annular walls defining a raised rib formed in the recess and concentric with the closure wall,

said raised rib in turn defining in part two concentric downwardly extending ribs in said recess,

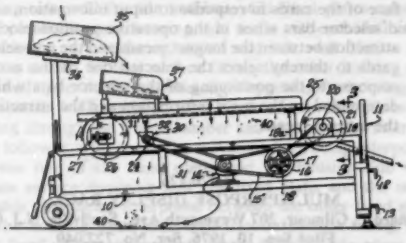
and a plurality of upwardly extending bosses formed in the recess and aligned with the space defined by and extending over the annular walls of the raised rib, said bosses being radially wider than said space to span said space and engage the bottoms of the downwardly extending ribs of a like lid stacked on it to prevent the lids from compacting when an axial directed force is applied to like lids.

4,076,124

MECHANICAL EARTHWORM HARVESTER

Dell A. Taysom; Larry D. Taysom; Robert J. De Witt, and Carl S. De Witt, all of Hemet, Calif., assignors to Carroll S. Mohr, Fountain Valley, Calif.

Filed Feb. 16, 1977, Ser. No. 769,176
Int. Cl.² B07C *1/10*
U.S. Cl. 209—75 **6 Claims**



1. A device for separating earthworms from bedding and worm castings, said device comprising;

and endless belt fabricated from a screen having a mesh size of between 3/16 and ¼ inches, said endless belt having an upper separating surface held at an incline of about 1° to 15° with respect to the horizontal;

drive means for moving said belt in the direction of the upward incline at a speed of between 0.3 and 5 feet per second;

vibrating means for vibrating the separating surface so that when a mixture of earthworm bedding material containing earthworms, bedding and worm castings is placed on the

separating surface, the worms are conveyed upwardly along the separating surface and pass over the upper edge thereof, the worm castings pass through the separating surface and a substantial portion of the bedding material moves downwardly along the incline separating surface and passes over the lower edge thereof.

4,076,125

CARD RETRIEVAL SYSTEM

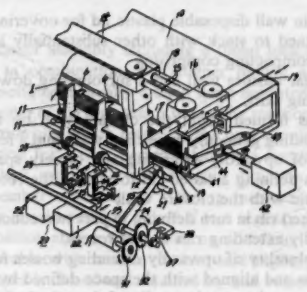
Mikio Ohsaki, Kashihara; Toshiaki Kawamoto, and Osamu Fujimoto, both of Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 21, 1976, Ser. No. 688,697

Claims priority, application Japan, May 22, 1975, 50-61730; Jun. 9, 1975, 50-69835; Jun. 23, 1975, 50-77736

Int. Cl.[2] B07C *3/18*; G06K *21/00*

U.S. Cl. 209—80.5 **8 Claims**



1. A card retrieval system comprising:

a multiplicity of cards stored in a stationary stack structure, each of said cards being provided with a face which includes a magnetic strip and a notch structure formed in the magnetic strip;

means for receiving input information for the purpose of selecting a specific card;

magnet means for magnetically attracting the cards;

a predetermined number of selector bars adapted to engage with the notch structures of the cards;

said selector bars being mounted to be rotatable from an inoperative to an operative position and to be laterally displaceable relative to the stationary stack structure;

said selector bars being mounted to be movable along the face of the cards in response to input information; and

said selector bars when in the operative position block the attraction between the magnet means and the non-selected cards to thereby select the selected one of the cards in response to the positioning of the selector bars which is determined by the input information and the attraction of the magnet means.

4,076,126

MULTIPURPOSE DISPLAY RACK

Richard C. Gilmour, 207 Weymouth Ave., Scullville, N.J. 08330

Filed Sep. 10, 1976, Ser. No. 722,049

Int. Cl.[2] B42F *13/12*; A47F *7/024*

U.S. Cl. 211—59.1 **13 Claims**

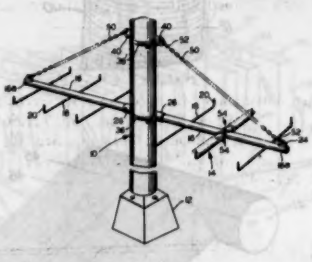
1. A display rack for attachment to an upright pole member or the like comprising:

A. an extension arm having a socket end and an outer end and a suspension bracket affixed thereto at a location spaced from said socket end towards said outer end;

B. a holder comprising a hollow member of substantially uniform cross section having a mounting seat at one end and a socket opening at its other end, said mounting seat being comprised by said one end of said holder being cut to shape said one end of said holder for seating upon a surface of an upright pole member or the like; said socket opening receiving said socket end of said extension arm, said holder further having a holder aperture therein located adjacent said one end;

C. first flexible mounting means engaging said holder through said holder aperture and adapted to mount said holder to the upright pole member or the like with said one end seated thereagainst;

D. a support bracket having a mounting seat at one end and a support bracket aperture located adjacent said one end;



E. second flexible mounting means engaging said support bracket through said support bracket aperture and adapted to mount said support bracket to the upright pole member or the like;

F. a support link connecting said suspension bracket to said support bracket to support said extension arm therefrom; and

G. a plurality of hangers attached to said extension arm and extending transversely therefrom and terminating in respective distal ends remote from said extension arm.

4,076,127

DEVICE FOR THE PURPOSE OF PREVENTING A BODY DEPENDING FROM ROPES FROM SWINGING

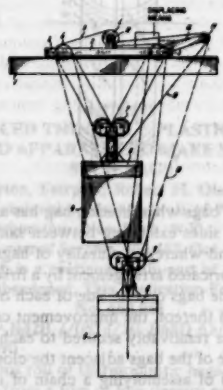
Leonard Hupkes, Heemstede, Netherlands, assignor to Conrad-Stork B.V., Haarlem, Netherlands

Filed Dec. 9, 1976, Ser. No. 748,914

Claims priority, application Netherlands, Dec. 11, 1975, 7514471

Int. Cl.[2] B66C *17/00*

U.S. Cl. 212—10 **6 Claims**



1. A device for raising and lowering a load while preventing swinging of the load, said device comprising a container bridge, a trolley displaceable on said bridge, a drum on said trolley, sheaves on said drum and on the load to be raised and lowered, hoisting cables extending from said sheaves on said drum to the sheaves on the load for lowering and raising the load by pay-out and wind-up of the cables, and means for

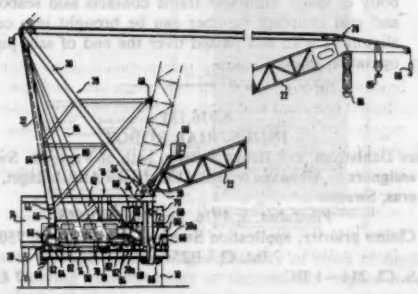
preventing swinging of the load comprising at least one positioning wire connected to said trolley for being paid-out and wound-up, one end of said positioning wire being secured to said load such that said wire extends obliquely upwards therefrom at an angle with respect to said hoisting cables, and a further drum on said trolley, the other end of said positioning wire being attached to the further drum on the trolley to pay-out and wind-up the positioning wire to a smaller extent than the hoisting cables such that the load is raised and lowered along a path inclined with respect to the vertical.

4,076,128

ROTARY CRANE

Hans Tax, Potsdamer Str. 3, Munich 40, Germany (8000)

Filed Sep. 9, 1976, Ser. No. 721,664
Claims priority, application Germany, Sep. 15, 1975, 2541065
Int. Cl.² B66C *23/72, 23/52*
U.S. Cl. 212—48 **10 Claims**



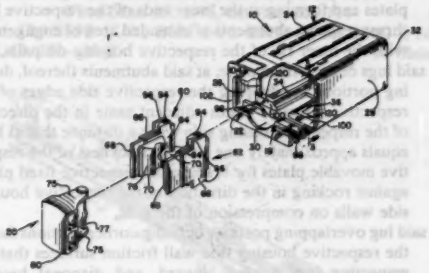
1. A rotary crane comprising, in combination:
(a) a base carrying a track circular about an upright axis;
(b) a turntable;
(c) a plurality of undercarriage assemblies mounted on said turntable for movement along said track,
(1) a first and second undercarriage assembly having respective portions fastened to said turntable for pivotal movement about respective pivot axes radial relative to said upright axis;
(d) a boom including two elongated boom members having respective first, longitudinally terminal, transversely spaced portions fastened to said turntable for pivoting movement about a common horizontal axis,
(1) said boom members converging from said first terminal portions thereof in a radially outward direction relative to said upright axis toward respective second terminal portions fastened to each other;
(e) a column upwardly projecting from said turntable,
(1) two load-bearing members of said column having respective bottom ends secured to said turntable contiguously adjacent said common horizontal ais and said first terminal portions respectively and extending from said common axis obliquely upward and opposite to said radially outward direction,
(2) said portions of said first and second undercarriage assemblies being substantially aligned vertically with respective ones of said first terminal portions and of said bottom ends,
(3) a part of said turntable having the shape of a right triangular prism including one edge member extending substantially along said upright axis, and two other side members connecting said bottom end and said first terminal portions to said first and second undercarriage assemblies;
(f) a tension member having respective end portions fastened to said column and to said second terminal portions for maintaining a desired angular position of said boom relative to said common axis;
(g) a flexible hoisting member extending from said column to said second terminal portions and depending from said second terminal portions for receiving a load;
(h) winch means for varying the effective lengths of said tension member and of said hoisting member; and
(i) a counterweight on said turntable spaced from said upright axis in a direction away from said boom.

4,076,129

FRICTION MECHANISM FOR DRAFT GEAR

Richard J. Housman, Dolton, Ill., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Sep. 22, 1976, Ser. No. 725,513
Int. Cl.² B61G *9/10*
U.S. Cl. 213—33 **4 Claims**



1. In a draft gear for railroad cars including a housing having front and rear ends and defining a rear chamber at the rear end of the housing and a front chamber at the front end of the housing in open communication with the rear chamber and open at the front end of the housing, said housing having opposed top and bottom walls and a pair of opposed side walls separating said top and bottom walls to define said chambers, cushioning means in the rear chamber, an intermediate follower seated against said cushioning means, with each of the housing side walls carrying in the housing front chamber adjacent said housing front end an inwardly facing friction surface, with said side friction surfaces facing each other, an energy dissipative friction device mounted in the housing front chamber and comprising a pair of fixed plates disposed between the housing side wall friction surfaces, said fixed plates substantially paralleling said housing side walls and each defining a first friction surface facing one of said side wall friction surfaces, a second friction surface facing the other housing side wall, and upper and lower side edges opposing the housing top and bottom walls, respectively, a pair of movable plates extending through the front chamber and engaging the intermediate follower, with one of the movable plates being interposed between one of the fixed plates and the housing side wall friction surface opposing said one fixed plate, and the other movable plate being interposed between the other fixed plate and the housing other side wall friction surface facing said other fixed plate, said movable plates defining side edges opposing the housing top and bottom walls, respectively, a pair of wedge shoes having wedge surfaces facing sidewise of said housing interposed between and engaging the respective second friction surfaces of said fixed plates, and a thrust wedge acting between said shoes to urge said wedge surfaces of said shoes into cooperation with the fixed plates during compression of the gear, with the housing top and bottom walls at said front chamber being formed to define opposed pairs of inner and outer ribs spaced apart longitudinally of the housing and extending transversely of the housing and crosswise of said plates, and with said movable plates on either side of the housing in extending through the housing front chamber being disposed between said rib pairs thereof to present the inner

ends of said movable plates for engagement with the intermediate follower, and front follower means acting consecutively on said thrust wedge and the outer ends of said movable plates to force same inwardly and longitudinally of said housing on compression of the gear,

the improvement for prolonging the useful life of the gear as represented by the spacing of said outer ends of said movable plates from said front follower means in the riding position of said gear, said improvement comprising:

said fixed plates each including on each side edge of the respective fixed plates a lug seated between the ribs of the housing top and bottom wall rib pairs to hold said fixed plates against movement longitudinally of the housing on compression of the gear,

said lugs respectively projecting laterally from said side edges of the respective fixed plates in the direction of, but short of, the housing side wall friction surfaces opposing the respective first friction surfaces of the respective fixed plates and forming at the inner ends of the respective lugs thrust resisting abutments of extended area of engagement with the inner rib of the respective housing rib pairs,

said lugs of each fixed plate, at said abutments thereof, defining portions overlapping the respective side edges of the respective movable plates adjacent same in the direction of the respective housing side walls a distance that at least equals approximately one half the thickness of the respective movable plates for bracing the respective fixed plates against rocking in the direction of the respective housing side walls on compression of the gear,

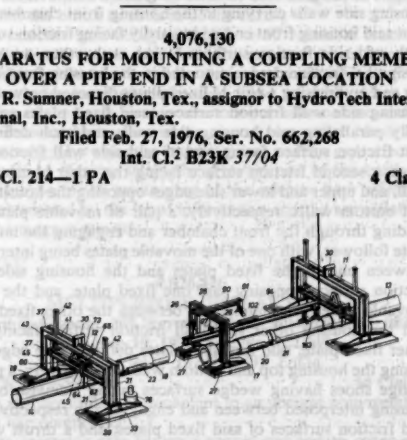
said lug overlapping portions defining corner portions facing the respective housing side wall friction surfaces that the respective lugs project toward, and diagonal bracing portions extending from the respective lug corner portions to the respective fixed plate side edges adjacent the median portions of the respective fixed plates for bracing the respective lug corner portions against the respective fixed plates to resist said rocking of said fixed plates under force concentrations acting in the directions of said housing side walls against said fixed plates adjacent their outer ends on compression of the gear prior to engagement of the outer ends of said movable plates by said front follower means on initial compression of the gear.

4,076,130

APPARATUS FOR MOUNTING A COUPLING MEMBER OVER A PIPE END IN A SUBSEA LOCATION

Glen R. Sumner, Houston, Tex., assignor to HydroTech International, Inc., Houston, Tex.

Filed Feb. 27, 1976, Ser. No. 662,268
Int. Cl.² B23K *37/04*
U.S. Cl. 214—1 PA **4 Claims**



1. In apparatus for mounting a coupling member over the end of a pipe in a subsea location where the pipe end is being supported in cantilevered fashion, the combination comprising:

a frame arranged for lowering to and mounting generally adjacent said pipe end and supported on the seabottom;

an elongated support beam connected to said frame and arranged to extend generally longitudinally over said pipe to support said coupling member therebelow;

a carriage mounted on said support beam for longitudinal travel thereon;

means for moving said carriage longitudinally along said support beam;

means connected to said carriage means for holding said coupling member therebelow;

a guide beam connected to said frame and extending generally transversely thereto;

means connected to said guide beam for initially contacting and holding said support beam in generally parallel alignment therewith;

alignment means connected to one end of said support beam for contacting said pipe and spacing said beam end a predetermined distance therefrom;

means connected between said frame and said beam for raising and lowering said beam while said coupling member is supported thereby;

and means for moving said support beam transversely relative to said frame and said pipe;

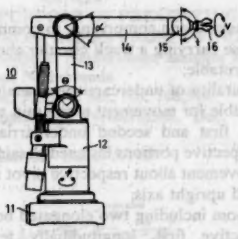
whereby said frame and said coupling can be lowered in a body of water until said frame contacts said seabottom, and said coupling member can be brought into coaxial alignment with and passed over the end of said pipe by operation thereof.

4,076,131

INDUSTRIAL ROBOT

Lars Dahlstrom, and Bengt Nilsson, both of Vasteras, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Jun. 3, 1976, Ser. No. 692,553
Claims priority, application Sweden, Jun. 16, 1975, 7506848
Int. Cl.² B25J *9/00*
U.S. Cl. 214—1 BC **17 Claims**



1. Industrial robot comprising a movable arm part, a tool part including a tool, connecting means flexibly mounting the tool part on the arm part for movement with at least one degree of freedom relative to the arm thereby reducing mechanical stresses when the tool comes into contact with a workpiece or other obstacle, displacement transducer means associated with one of the parts to sense the position of the tool relative to the arm, and to generate a signal (x_s) corresponding to said position, automatic control means for moving the arm part, and means for transmitting said signal to said control means for moving the arm part in dependence upon said position.

4,076,132

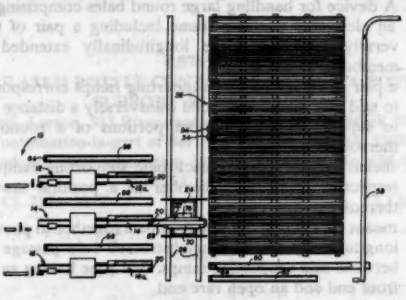
BOBBIN TRANSPORTING AND STORAGE SYSTEM

Walter F. Thompson, and Dennis M. Redo, both of Somerville, N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed Oct. 28, 1975, Ser. No. 626,371
Int. Cl.² B65G *1/08*
U.S. Cl. 214—16.4 A **22 Claims**

1. A wire transport system for a communication cable manufacturing facility in which wire is wound on bobbins having flanges on both sides thereof and on which the bobbins roll from one location to another, including in combination a num-

ber of machines for making insulated wires with different color coding and winding the wire on successive bobbins, a first set of tracks including one for receiving successive bobbins from each machine, each of the tracks being of a length to receive and accumulate a plurality of bobbins from its machine and which are wrapped with wire of the same color coding, a second set of tracks extending generally parallel to the first set of tracks and at substantially the same level as the first set of tracks and horizontally spaced therefrom, tracks of the first set sloping downward toward one end thereof, and tracks of the second set sloping downward toward the opposite end thereof, whereby the bobbins roll by gravity along the tracks in different directions toward or from each of the machines for making the insulated wires, a carriage track extending transversely of the bobbin tracks at the ends of the bobbin tracks remote from the machines, an inventory storage rack having a plurality of bobbin holding compartments at spaced locations in a row on a common level along the length of the carriage track, said



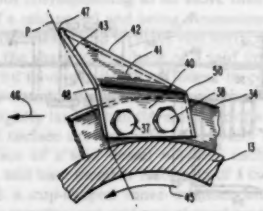
inventory storage rack having a plurality of rows of similar bobbin holding compartments at successively higher levels above the level of the carriage track, an elevator with a track for receiving bobbins selectively from each of the first bobbin tracks, the elevator having supporting surfaces on which the bobbin flanges roll on and off the elevator, from the first and second set of tracks, respectively, means for bringing empty bobbins back to the elevator for delivery to said second track for return to the machines for rewinding, guide surfaces along the tracks for maintaining the bobbin flanges in substantial alignment with the tracks on which the bobbins roll, a shaftway in which the elevator travels up and down, and a carriage on which the elevator shaftway and elevator are supported for movement as a unit with the carriage along the carriage track, the elevator being movable successively into line with the first and second bobbin tracks of any of the machines and then into alignment with any compartment for storing bobbins with wire of the same color coding in the same compartment of the inventory storage rack.

4,076,133

SILO UNLOADER BLADES

Richard L. Weaver, Rte. 4, Myerstown, Pa. 17067

Filed Nov. 26, 1975, Ser. No. 635,395
Int. Cl.² B65G *65/46*
U.S. Cl. 214—17 DA **3 Claims**



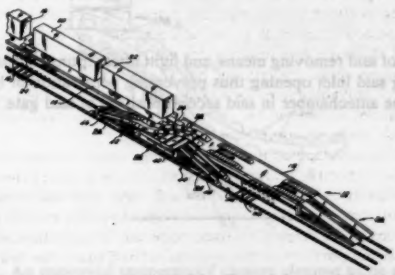
1. In a silo unloader apparatus, wherein an unloader of the auger type is provided for use at the bottom of a silo for bottom discharge of silage therefrom, and wherein the auger is of the radially directed worm type that advances or sweeps across the silo floor about a generally centrally located axis and that rotates in a forward silage-engaging direction about is own axis to bring teeth carried thereby into engagement with silage, the improvement comprising said teeth having blunt leading edges that face in the direction of rotation and are not substantially backwardly raked, so as to be of plow-like construction, wherein said teeth leading edges and adjacent raked edges define acute angular relationships therebetween with the apex of the angular relationship in each instance being located at a forward portion of the associated said tooth.

4,076,134

WHEELED RAMP LOADING AND UNLOADING APPARATUS

Herbert T. Landow, North Tarrytown, N.Y., assignor to Landow Consulting Associates, Inc., North Tarrytown, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,714
Int. Cl.² B65G *67/00*; B65J *1/10*; E01D *15/12*; E04G *3/16*
U.S. Cl. 214—38 B **14 Claims**



1. A ramp device for guiding vehicles to and from laterally adjacent cars of a railroad train, said ramp device comprising a body, ramp means for guiding said vehicles between the ground and the tops of said cars, said ramp means extending up from the ground in a first direction and further forming bridge means having a portion extending laterally over a side of said body and adapted to extend over a side of a railway car in a second direction transverse to said first direction, said laterally extending portion of said bridge means providing continuous means for enabling said vehicles to move onto said cars of said train in a direction longitudinal of said cars.

4,076,135

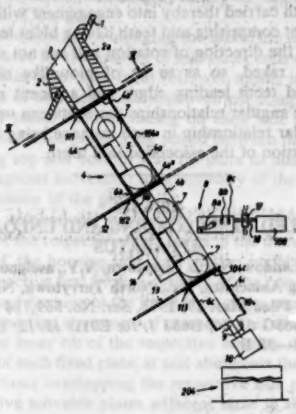
APPARATUS FOR PROCESSING CASSETTES CONTAINING EXPOSED PHOTOGRAPHIC FILMS

Klaus Klose, Holzkirchen, Germany, assignor to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 5, 1976, Ser. No. 729,773
Claims priority, application Germany, Oct. 9, 1975, 2545215
Int. Cl.² B65G *65/04*
U.S. Cl. 214—300 **27 Claims**

1. In an apparatus for processing containers for photographic films, particularly cassettes for exposed photographic roll films, a combination comprising a conveyor defining a predetermined path for transport of successive containers in a predetermined direction; an enclosure adjacent to a first portion of said path and defining an antechamber having an inlet opening for admission of containers into and an outlet opening for evacuation of containers from said antechamber; means for removing films from successive containers in a second portion of said path which is located downstream of said outlet opening, as considered in said direction; a light-intercepting gate movable between at least one operative position in which said gate prevents the penetration of light and the transport of containers from said antechamber into said second portion of said path by way of said outlet opening and a second position

in which said portions of said path are in communication with each other by way of said outlet opening and said conveyor is free to transport a container from said antechamber into the



range of said removing means; and light intercepting means for sealing said inlet opening thus preventing penetration of light into the antechamber in said second position of said gate.

4,076,136

PIPE STRAIGHTENING AND SPINNING METHOD AND APPARATUS

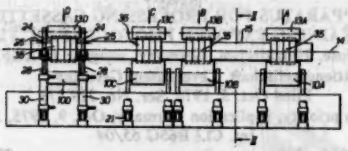
Royston Paul Jenkin, St. Austell, England, assignor to English Clays Lovering Pochin & Co. Ltd., St. Austell, England

Filed Nov. 12, 1975, Ser. No. 631,233

Claims priority, application United Kingdom, Nov. 21, 1974, 50585/74; Nov. 21, 1974, 50587/74

Int. Cl.² B21D *3/02*

U.S. Cl. 214—340 18 Claims



1. A method of temporarily straightening and spinning a non-straight pipe comprising providing a plurality of removable circular collars axially spaced along the pipe, which collars circumferentially closely surround the pipe and have a higher yield strength in the circumferential direction than that of the pipe wall, each collar being formed of three segments of approximately equal arcuate length and two of the segments being hingedly connected to respective opposite ends of the third segment so as to allow the segments to be pivoted relative to each other to open the collar for positioning the collar around the pipe, applying forces to the collars by means of roller elements in directions so as to straighten the pipe and to hold it substantially straight during rotation, and rotating the collars and the pipe.

4,076,137

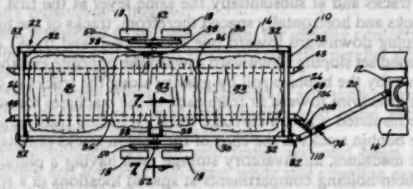
LARGE ROUND BALE HANDLING APPARATUS

Joseph Benedict Kucera, Traer, Iowa, assignor to Rudolph L. Lowell, Des Moines, Iowa, a part interest

Filed Aug. 5, 1976, Ser. No. 711,967

Int. Cl.² B60P *3/00*

U.S. Cl. 214—394 4 Claims



1. A device for handling large round bales comprising:

a. an elongated portable frame including a pair of transversely spaced opposite longitudinally extended side members,

b. a pair of elongated bale supporting ramps corresponding to said side members spaced transversely a distance apart to support opposite bottom portions of a round bale thereon,

c. means rigidly securing each bale supporting ramp to a respective frame side member at a position inwardly thereof,

d. means connecting the side members together to provide a longitudinally extended unobstructed bale passage zone between said supporting ramps, said zone having an open front end and an open rare end,

e. hitch means having one end connected to the portable frame and the other end connectable to a towing vehicle,

f. a pair of transversely spaced ground wheel assemblies, one on each side of the frame located outwardly of an adjacent side member,

g. means movably supporting the frame on the ground wheel assemblies for up and down tilting movement, and

h. power lift means for raising and lowering the frame between a raised bale transport position and a lowered bale loading position,

i. said frame, when in the lowered bale loading position, being movable in a forward direction axially of a ground supported round bale to receive a bale within the front end of said bale passage zone and between said side ramps whereby, on actuation of the power lift means the round bale is lifted on the side ramps to said transport position said round bale on movement of the frame from the transport position to the bale loading position being unloaded from the open rear end of the bale passage zone on movement of the frame in the forward direction.

4,076,138

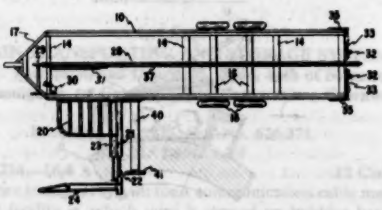
ROUND BALE LOADER AND CARRIER

Ben K. Honomichl, Sr., Box 68, Jefferson, S. Dak. 57038

Filed Jan. 7, 1976, Ser. No. 647,125

Int. Cl.² B60P *1/36*

U.S. Cl. 214—518 4 Claims



1. Carrier means for carrying substantially cylindrical ob-

jects comprising a carrier frame mounted on wheels for transport, platform means pivotally connected to said frame near one end thereof, a carrier arm slidably mounted on said platform means for movement toward and away from said platform means, said carrier arm and said platform means each including means extending substantially parallel to said frame arranged to bracket said cylindrical object, power means connected between said carrier arm and said platform means adapted to slide said carrier arm relative to said platform means, and second power means connected between frame and said platform means to pivot the platform means relative to said frame whereby said cylindrical object may be raised and rolled onto said frame, and discharge means provided on said frame including a pair of arms hinged to said frame and located so that said cylindrical object will be moved onto them, said arms being supported from said frame in laterally spaced relation to each other, one arm being generally higher than the other so that said object will be caused to roll off to the side of said arms.

4,076,139

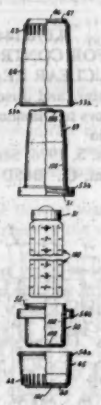
INSULATED BOTTLE CONTAINER HAVING A BOTTLE SUPPORT AS ONE PART

Scott E. Larson, 313 Riverwoods Lane, Burnsville, Minn. 55337

Continuation-in-part of Ser. No. 596,468, July 16, 1975, abandoned. This application Jun. 16, 1976, Ser. No. 696,696

Int. Cl.² A61J *9/00*

U.S. Cl. 215—11 C **8 Claims**



1. A thermal-insulating container particularly adapted to completely contain an elongate vessel such as a baby bottle containing liquid at a predetermined temperature, said container comprising a cup-shaped base member and a cup-shaped cover member having mating portions adapted to be engageable secured together, said members being formed of a thermally insulating material and when secured together defining a generally cylindrical central cavity, said base member having a bottom end capable of supporting said container in an upright position and being open on the opposite end to define a cavity having a depth corresponding to no more than about one-half the length of a said vessel and being dimensioned to provide a frictional fit therewith, and an inner end surface corresponding generally to the shape of the base of a said vessel, said cover member cavity having a depth sufficient to contain that portion of a said vessel not contained in said base member cavity, a diameter slightly larger than the diameter of a said vessel and an inner end surface corresponding generally to the shape of the top surface of a said vessel wherein each of said cover member and said base member is formed of a cup-shaped outer member and a cup-shaped inner member one of said cup-shaped outer member and said cup-shaped inner member having a peripheral ridge at its open end and the other of said cup-shaped outer member and said cup-shaped inner member having a flange member at its open end, a said flange member having a portion projecting toward the closed end of the member with which it is associated and spaced from its outer surface providing an annular socket for receiving and engaging the open end of the other of said outer or inner members with said ridge abutting and in engaged relationship with the projecting portion of said flange member to provide said cover and base members having cavities between their inner walls and their outer walls.

4,076,140

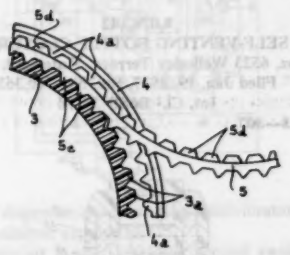
TAMPERPROOF CLOSURE ELEMENT

Raymond Perne, Morance, France, assignor to Astra Plastique, Saint-Georges de Reneins, France

Filed Jan. 13, 1977, Ser. No. 759,292

Int. Cl.² B65D *41/32*

U.S. Cl. 215—256 **2 Claims**



1. An improved tamperproof closure element to be applied to the neck of a container, the closure element having a top cap section joined to a tear strip which has a lower container gripping collar, the tear strip being attached to said cap section along abutting faces at an annular zone of reduced strength, the cap section and collar and tear strip being integrally formed of molded synthetic material, the improvement comprising at the annular zone between the tear strip and the cap section:

a first annular series of spaced projections extending radially from the section toward the tear strip;

a second annular series of spaced projections extending radially from the tear strip toward the section, the projections of said series being shaped to mutually interfit to provide a continuous closure; and

the projections of each annular series of projections being partially axially displaced from the projections of the adjacent interfitting series of projections to reduce to a thin layer the material which joins the tear strip to the adjacent section where said projections are mated.

4,076,141

TEAR-OFF CLOSURE WITH ENTRAPPED PULL-RING

Paul R. Lewis, Richmond, Ind., assignor to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 661,255, Feb. 25, 1976, Pat. No. 4,037,551. This application Mar. 3, 1977, Ser. No. 773,827

Int. Cl.² B65D *41/42*

U.S. Cl. 215—254 **5 Claims**

1. A closure for a container comprising:

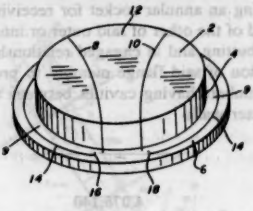
a top end wall;

a closure skirt around the top end wall;

a radially outwardly projecting annular rim around the bottom of the closure skirt; and

an integral pull ring around the bottom of the skirt comprising a curled bead having a radially inwardly open slot

therein defined by adjacently disposed surfaces of said bead with a terminal edge portion of said annular rim



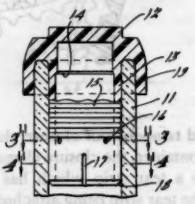
projecting into and entrapped between said adjacently disposed surfaces of said bead.

4,076,142

SELF-VENTING BOTTLE CLOSURE

John F. Naz, 6523 Wellesley Terrace, Waterford, Mich. 48095

Filed Jan. 19, 1977, Ser. No. 760,362
Int. Cl.² B65D 51/16
U.S. Cl. 215—307 1 Claim



1. A stopper for the open end at the neck of a bottle having a gas pressure generated therewithin after the stopper has sealed the end thereof, means associated with the stopper to relieve the gas pressure within the bottle before the stopper is removed therefrom, annular ribs provided on the exterior wall of the stopper to form a plurality of sealing engagements with the interior wall of the bottle neck to seal the gas within the bottle, said stopper being hollow and provided with a resilient wall containing through apertures between the top and bottom ends through which the gas can escape when the stopper is partially removed from the bottle neck, the inner surface of the wall being provided with spaced recesses to divide the wall into joined sections which are forced outwardly by the pressure of the contained gas to circumferentially engage the wall and hold the stopper from being expelled from the bottle before the pressure is relieved.

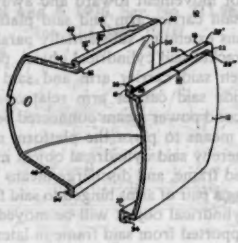
4,076,143

RECTANGULAR SEAL BEAM LAMP UNIT

Frank Jenne, Jr., South Euclid, and Denes Tarnay, Cleveland, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 13, 1976, Ser. No. 750,004
Int. Cl.² H01J 5/20
U.S. Cl. 220—2.1 R 13 Claims

1. A rectangular shaped pressed glass lens for a sealed beam lamp unit which includes a sealing rim having front and back sealing surfaces wherein the improvement comprises a longitudinally extending molded projection disposed on the back



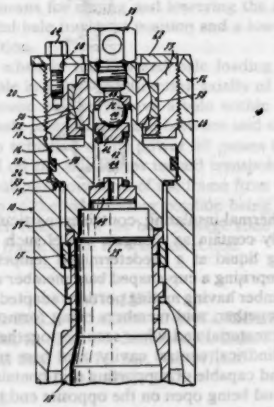
sealing surface of said sealing rim intermediate the inner and outer edges.

4,076,144

TOP CLOSURE FOR CONTROL ROD DRIVE FOR NUCLEAR REACTOR

Jean H. Raas, Lancaster, and Joseph I. Schwartz, Columbus, both of Ohio, assignors to Diamond Power Specialty Corporation, Lancaster, Ohio

Filed Jun. 3, 1976, Ser. No. 692,386
Int. Cl.² B65D 51/16
U.S. Cl. 220—367 3 Claims



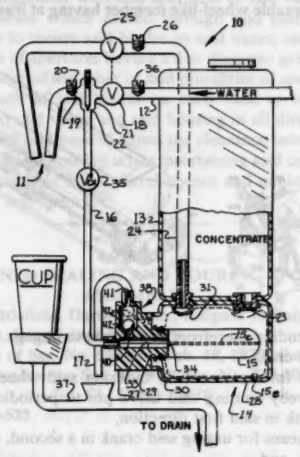
1. A closure assembly for a tubular control rod drive housing of circular cross section comprising an annular mounting ring threadably insertable in and removable from the end of the housing and means for sealing the housing and the central opening of the annulus defined by such ring, at a position below the ring, including a closure insert having a sealing head slidably sealably engageable with the interior of the housing, characterized by a neck portion extending outwardly through and rockable in said opening, and a ball and socket joint in the neck portion of the ring and connecting the ring and insert for axial movement as a unit but permitting rocking of the insert and rotation of the ring independently of the insert.

4,076,145

METHOD AND APPARATUS FOR DISPENSING A BEVERAGE

Alfred E. Zygiel, deceased, late of Dallas, Tex. (by Mary E. Zygiel, heir), assignor to The Cornelius Company, Minneapolis, Minn.

Filed Aug. 9, 1976, Ser. No. 712,935
Int. Cl.[2] B67D 5/56; G01F 11/08
U.S. Cl. 222—1 12 Claims



8. A method of mixing and dispensing a beverage comprising the steps of:

a. providing a beverage concentrate in a metering chamber;

b. opening a dispensing valve and passing a flow of water through a water line from a pressurized water source to a dispensing head;

c. partially obstructing the flow of water and developing a bypass pressure downstream of the valve when the valve is opened;

d. directing a bypass flow of water under the bypass pressure through a bypass line to an open drain valve;

e. closing the drain valve with the flow of water thereinto;

f. maintaining the drain valve closed with the bypass pressure;

g. directing the bypass flow of water under the bypass pressure into the metering chamber and displacing concentrate therefrom;

h. transferring the displaced concentrate to the dispensing head and combining the concentrate with water to form a palatable beverage;

i. closing the dispensing valve, thereby terminating the flow of water and limiting the amount of beverage dispensed, and dropping the bypass pressure;

j. opening the drain valve in response to the dropping of the bypass pressure; and subsequently

k. draining the bypass water from the metering chamber through the open drain valve.

4,076,146

DISHWASHERS AND DETERGENT DISPENSERS

Johannes Willebrordes Lausberg, Mulgrave, and Denys Edward Downton, East Brighton, both of Australia, assignors to Gibson Chemicals International Pty. Limited, Revesby, Australia

Filed Mar. 3, 1976, Ser. No. 663,310
Int. Cl.[2] D06F 33/02; F04B 19/00
U.S. Cl. 222—52 12 Claims

1. A liquid dispenser for dispensing a first liquid to a reservoir, said dispenser comprising

a pumping device having an inlet adapted to receive said liquid and an outlet adapted to be placed in communication with said reservoir, and

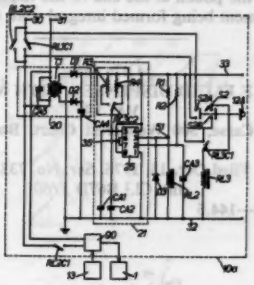
control means controlling operation of the pumping device and effecting operation of the pumping device to pump a metered amount of said first liquid into said reservoir, said control means comprising

a timer circuit, and

sensing means adapted to sense the commencement of delivery of other liquid to said reservoir,

said sensing means operating, during use of the dispenser and pursuant to said sensing, to activate the timer circuit to thereby actuate said pumping device for a first predetermined time,

said timer circuit including a monostable multivibrator, said sensing means including first switch means actuated, in



use of the dispenser, to activate the multivibrator by application of electric supply thereto,

said timer circuit further including second switch means operated, pursuant to said application of supply to the multivibrator, to effect said actuation of the pumping device by switching electric supply thereto, said multivibrator being switched to a first state upon said application of said supply thereto at which state said actuation of the second switch means is not precluded, but passing to a second state after said predetermined time at which the second switch means is deactuated to end dispensing,

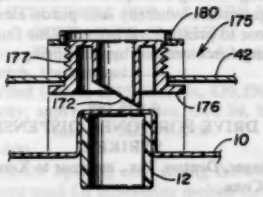
said timer circuit further including latching means for latching said second switch means following application of supply to said multivibrator, until deactuation thereof under control of the multivibrator occurs, irrespective of any intervening deactuation of said first switch means.

4,076,147

LIQUID CONTAINER HAVING A PLASTIC FILM POUCH AND A PIERCING ELEMENT TO OPEN THE PLASTIC FILM POUCH

Justin M. Schmit, 126 Sea Island Lane, Boca Raton, Fla. 33432

Filed May 4, 1976, Ser. No. 683,174
Int. Cl.[2] B67B 7/26
U.S. Cl. 222—89 10 Claims



10. A container for dispensing fluid comprising, a carton having sides defining a generally rectangular cross section and a height dimension greater than the dimension of a side with a

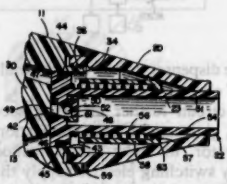
sealed bottom and top end; said carton being made of a paper material and having an aperture through the sealed top end; a flexible pouch of plastic material positioned in the carton, said pouch being formed with seamed edges defining sides and a top; a tubular member positioned through the top of the pouch with a pouch being formed around the tubular member; a locking ring positioned over the tubular member and the top of the pouch and securing the tubular member therein; a sleeve member positioned telescopically over the locking ring with the exposed end of the tubular member being open; said locking ring being positioned through the aperture in the sealed top end of the carton with said sleeve member being positioned over the aperture and cooperating with the locking ring to retain the pouch secured to the carton; a removable cap positioned over the sleeve member to seal the pouch; and including a piercing element telescopically fitted into the tubular member to open the pouch at the end of the tubular member, said piercing element being formed integral with the locking ring.

4,076,148

MULTIPLE FLUID DISPENSER WITH MECHANICAL VALVE

Clifford C. Carse, 500 Woodcrest Court, Boulder City, Nev. 89005

Filed Oct. 13, 1976, Ser. No. 732,020
Int. Cl.² B67D 5/60
U.S. Cl. 222—144.5 **3 Claims**



1. A dispensing apparatus comprising:
a housing having a flat discharge surface;
a nozzle connected to said housing and having a converging inner surface;
a plurality of conduits formed in said housing, each conduit communicating with a corresponding fluid reservoir, said conduits terminating at said flat discharge surface;
a linearly movable piston valve element mounted to slide within said nozzle, said piston having a head portion including a flat surface for abutting said flat discharge surface to open and close said conduits to the passage of fluid, and a tubular stem portion extending through said nozzle to direct the discharge of said fluid from said apparatus, said head portion having a centrally located recess with radially spaced openings for directing fluid radially against an interior wall of said tubular stem; and
a compression spring disposed around an exterior wall of said tubular stem and out of contact with the flow of fluid, said spring biasing said piston element against said flat discharge surface whereby said piston element is slidable in response to pressure variations in the fluid conduits and the biasing force created by said spring.

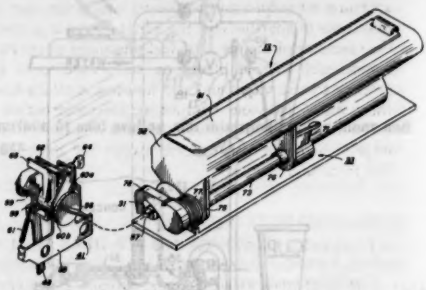
4,076,149

SLAVE DRIVE FOR TONER DISPENSER WITH STRIKER

Allan L. Saxinger, Denton, Tex., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 18, 1976, Ser. No. 658,980
Int. Cl.² B65G 3/12, 65/70
U.S. Cl. 222—202 **14 Claims**

8. A transmission for driving a toner dispenser having a reservoir for storing a supply of toner, a rotatably mounted dispensing roll for feeding metered amounts of toner out of said reservoir, and a biased impact device for importing shock forces to said reservoir to maintain a free flow of toner; said transmission comprising the combination of
a drive shaft having an enlarged flat at one end for connection to said dispensing roll,
a crank having one end coupled to said drive shaft for rotating said dispensing roll in a first direction and an opposite free end extending outwardly away from said drive shaft,
an indexable wheel-like member having at least one drive pin



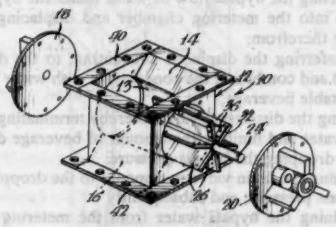
extending therefrom in position to engage the free end of said crank,
means for incrementally indexing said wheel-like member, thereby causing said drive pin to periodically urge said crank in said first direction,
bias means for urging said crank in a second, opposite direction, and
cam follower means coupled to said impact device in position to engage said flat for alternately cocking and releasing said impact device in response to rotation of said dispensing roll.

4,076,150

ROTARY AIRLOCK HAVING ADJUSTABLE BLADES TO MAINTAIN A SEAL

Donald D. Didrickson, 3648 Quince Court, Downers Grove, Ill. 60515

Filed May 14, 1976, Ser. No. 686,389
Int. Cl.² G01F 11/10
U.S. Cl. 222—368 **6 Claims**



1. A rotary airlock for conveying material having a housing which includes a cylindrical wall and a pair of end walls which together define a generally cylindrically shaped chamber and a plurality of rotating members in said chamber which extend toward said housing and are spaced therefrom to permit rotation while maintaining a seal with said housing, said airlock comprising:
a rotatable shaft extending axially through said chamber;
said plurality of rotating members comprising a plurality of vanes having one edge secured to said shaft, the remaining edges of said vanes terminating adjacent to and spaced from said cylindrical wall and said end walls respectively, each of said vanes being provided with a plurality of

apertures adjacent to said remaining edges of said vane; a plurality of blades secured to said remaining edges of each of said vanes and extending toward said housing, with at least one blade on each edge adjacent the respective end walls and at least two blades in end-to-end relation on the edge adjacent said cylindrical wall, the adjacent edges of all of said blades having overlapping portions to define a continuous edge along said cylindrical wall and said end walls, each blade being provided with a plurality of apertures in alignment with said apertures in said vanes; and

fastening means which extend through said pluralities of apertures to secure said blades to said vanes, one of said pluralities of apertures having a first diameter greater than the diameter of the other of said pluralities of apertures to enable each of said blades on each vane to be moved relative to said vanes and said housing in all directions in the plane of said vane to adjust the clearance between said blades and said housing while maintaining said continuous edge to maintain a seal therebetween and minimize leakage from said airlock.

4,076,151

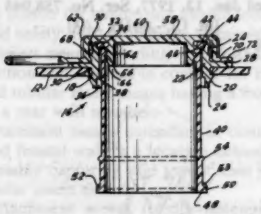
COMBINED SEALING AND POURING SPOUT ASSEMBLY

Herrick B. Littlefield, Darien, Conn., assignor to Polyproducts Corporation, Long Island City, N.Y.

Continuation of Ser. No. 550,914, Feb. 19, 1975, abandoned. This application Sep. 1, 1976, Ser. No. 719,409

Int. Cl.² B65D *47/10*

U.S. Cl. 222—525 **6 Claims**



1. A combined sealing and pouring spout assembly for a container comprising:

a carrier plug member adapted to be secured within an access opening in said container,

said carrier plug member including an opening therethrough,

a spout member telescopically received within said carrier plug opening and movable from a first position wherein a first end of said spout member is disposed within a plane substantially coextensive with the exterior surface of said carrier plug and a second position wherein said first end of said spout member is removed from said exterior surface of said carrier plug,

removable and replaceable sealing means engageable with both said spout member to seal said spout member to preclude fluid access from within said container and with said carrier plug when said spout member is in said first position to secure said sealing means to said carrier plug to retain said spout member secured within said carrier plug,

said removable sealing means comprising a screw cap closure member including an end wall member and a depending wall member extending from said end wall member,

said depending wall member provided with a screw thread form engageable with a mating screw thread form formed adjacent said first end of said spout member,

said screw cap closure including a depending member extending from said end wall member and radially spaced from said depending wall member,

said depending member including means cooperable with said carrier plug to sealingly secure said screw cap closure to said carrier plug, and

said carrier plug including an interrupted screw form thereon and wherein said means on said depending member of said screw cap closure includes an extending lug member adapted to fit between the interruption of said screw form and then be threadably engageable with said carrier plug to secure said screw cap closure on said carrier plug.

4,076,152

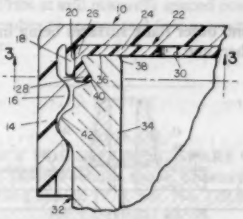
FITMENT-RETAINING CLOSURE

George V. Mumford, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 23, 1977, Ser. No. 799,847

Int. Cl.² B65D *47/00*

U.S. Cl. 222—545 **7 Claims**



4. A fitment-retaining closure and container combination comprising:

a container including a neck portion terminating in an annular rim defining an open mouth, said neck portion having a fitment-retaining groove formed near said annular rim and a plurality of threads formed therebelow;

a fitment member having a fitment top panel spanning the open mouth of said container and a fitment skirt depending from the outer periphery of the fitment top panel, the fitment skirt including an annular retaining bead extending inwardly from the lower end thereof and adapted to engage the fitment-retaining groove in the container neck portion; and

a fitment-retaining closure, including a closure top panel and a closure skirt depending from the outer periphery of said closure top panel, said closure skirt having threads formed on its interior surface which are adapted to matingly engage with said threads on the container neck to enable said closure to be placed in threaded engagement with said container, said closure top panel having a plurality of fitment-retaining, flexible projections extending downwardly therefrom and spaced about the circumference thereof to engage and retain said fitment member for simultaneous application of said closure and said fitment to said container.

4,076,153

PLATE STRUCTURE FOR A LIQUID METAL CONTAINER CLOSURE

Bernhard Tinnes, Zollikerberg, Switzerland, assignor to Metacon AG, Zurich, Switzerland

Filed Oct. 7, 1975, Ser. No. 620,270

Claims priority, application Sweden, Oct. 24, 1974, 7414231

Int. Cl.² B22D *41/08*

U.S. Cl. 222—600 **5 Claims**

1. In a device for opening and closing the outlet bore of a vessel of the type used for containing molten metallic material where the device includes:

a protective casing having a through bore,

a first plate member having an aperture therethrough aligned with said through bore,

valve means including a second plate member having an aperture therethrough, said valve means being mounted for sliding movement relative to said first plate member for controlling flow of said molten material from said bore and first plate aperture through said second plate aperture,

an outlet casing having a through bore aligned with said aperture of said second plate member, said casings each having butt joint portions disposed adjacent said respective plate members and surrounding said bores,

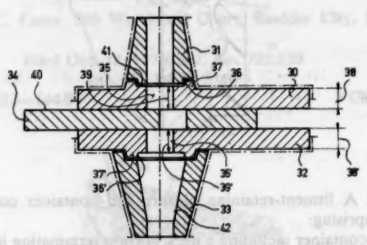
the improvement comprising:

each of said plate members having sealing surfaces and surfaces opposite said sealing surfaces,

said opposite surfaces having means defining a groove and key connection for said casings,

said means on each of said opposite surfaces including a bead projecting from said respective opposite surfaces, each bead having inner and outer flank surfaces with said bead surrounding said respective apertures in said plates,

said inner and outer flank surfaces being inclined toward one another, and



said inner flank surfaces of each bead having a base disposed on a diameter which is substantially greater than the diameter of said respective apertures to form about each said aperture an annulus having a substantial radial dimension, the thickness of each said annulus being less than the combined thickness of the respective plate and its bead,

said butt joint portion of said outlet casing forming with its said through bore a recess having a cross-section and sloping surface complementary to the outer end and outer flank surface of said second plate member bead whereby said butt joint portion of the outlet casing is disposed adjacent said second plate member exteriorly of its bead, and

the through bore of said outlet casing narrowing in the direction of flow and having its upstream end corresponding in cross-section substantially to the cross-section of the rim of the recess formed in said second plate member by the inner flank surface of its said bead.

4,076,154

SEALING MEANS FOR THE JOINT OF A CASTING LADLE CLOSURE

Bernhard Tinnes, Zollikerberg, Switzerland, assignor to Metacon AG, Zurich, Switzerland

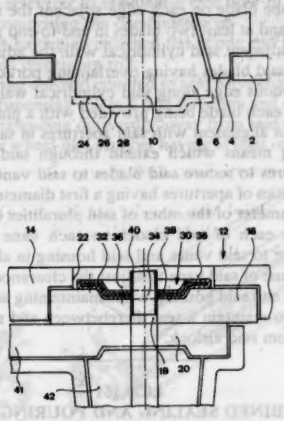
Filed Dec. 18, 1975, Ser. No. 641,872

Claims priority, application Switzerland, Jan. 16, 1975, 531/75

Int. Cl.² B22D *41/08*

U.S. Cl. 222—600 **5 Claims**

5. Sealing means for a joint between the outlet of a casting ladle and a plate member forming a portion of a movable closure for said outlet, said sealing means comprising a rigid core body shaped to surround said outlet and having an aperture therethrough alignable with said outlet, said rigid core body having opposite faces and an outside peripheral edge with said opposite faces and said outside peripheral edge being coated with flowable mortar material, said rigid core body



having anchoring means in the form of holes formed through said core body.

4,076,155

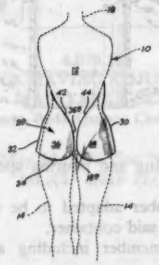
ATTACHMENT FOR HUMAN FIGURE FORM

Evangeline M. Calvin, 735 SW. St. Claire, Portland, Oreg. 97205

Filed Jan. 13, 1977, Ser. No. 758,946

Int. Cl.² A41H *5/00*

U.S. Cl. 223—68 **4 Claims**



1. An attachment, for a manikin depicting a non-pregnant, female figure, for preparing from the manikin a figure depicting a pregnant woman, the attachment comprising

a front expanse of sheet-like material including an upper region in said expanse shaped to depict the enlarged breasts of a pregnant female which upper region fits over the breasts of the manikin, said upper region including an upper margin which bears on the breasts of the manikin to support the attachment, the front expanse further including a lower region shaped to depict the enlarged abdominal region of a pregnant female,

opposed side expanses of sheet-like material joined to the lower region of said front expanse, said side expanses depicting the hips of a pregnant female, and

a rear expanse formed of sheet-like material, in the form of a pair of buttock panels, one joined to each side expanse, and said panels depicting the buttocks of a pregnant female, said buttock panels presenting unjoined opposed margins located approximately midway between the side expanses of the attachment whereby the attachment is divided along the back thereof,

the opposed side and rear expanses having upper margins

which together with the upper margin of the front expanse define an opening accommodating the projection therethrough of the shoulder region of a manikin with the attachment mounted on said manikin,

the sheet-like material in the attachment having sufficient stiffness whereby the attachment holds its shape while providing support for a garment draped thereover.

4,076,156

SAFETY HOLSTER

Menasha Emanuel Katz, 6102 Pimlico Road, Baltimore, Md. 21209

Filed Mar. 3, 1976, Ser. No. 663,626
Int. Cl.² F41C *33/02*
U.S. Cl. 224—2 B **12 Claims**

1. A safety holster for minimizing unauthorized removal of a gun from said safety holster confines, comprising:

a. tubular insert means extending in a substantially longitudinal direction and adapted in contour for insertion of said gun, said tubular insert means having a frontal wall member and a rear wall member;

b. gun securement means extending in continuous relation from said frontal wall to a location behind said rear wall for releasably capturing said gun at least partially within said tubular insert means;

c. fixed attachment means fixedly fastening in a pivotal relation to said frontal wall member one end of said gun securement means thereby providing relative rotation of said gun securement means relative to said frontal wall member; and,

d. releaseable detachment means for securing said gun securement means to and behind said rear wall member of said tubular insert means, said gun securement means extending in a substantially transverse direction to said longitudinal direction adjacent said rear wall member, said gun securement means extending beyond a contour boundary of said rear wall member in said transverse direction.

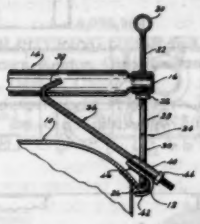
4,076,157

VEHICLE-TOP-CARRIER SUPPORT MEANS

Robert E. Hedstrom, and Edmund W. Brown, both of Racine, Wis., assignors to UPEC Corporation, Racine, Wis.

Filed Jul. 19, 1976, Ser. No. 706,917
Int. Cl.² B60R *9/04*
U.S. Cl. 224—42.1 E **5 Claims**

1. A means of securing a carrier rack over the top of a vehicle said vehicle having a gutter adjacent said top, said carrier rack having a longitudinally-extending tubular member, and ribs extending substantially normal to, and integral with said longitudinal member, said means comprising a U-shaped member having a foot portion positioned in said gutter, and legs extending upwardly to engage apertures in said longitudinal member and abutting said longitudinal member, a tension membr spaced between the legs of said U-shaped member and being separable from said U-shaped member and said carrier rack, said tension member embracing the exterior of said gutter and extending divergently to engage one of said ribs at a point inwardly spaced from said longitudnal member, said tension member having a hook which engages an aperture in



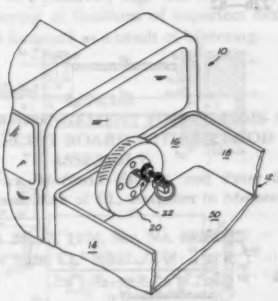
said one of said ribs at said inwardly spaced point and means on said tension member to secure said foot in positive engagement with said gutter.

4,076,158

DEVICE FOR SECURING SPARE TIRES

Rolla W. Barr, 16300 Fontaine Drive, Chesterfield, Mo. 63017

Filed Sep. 2, 1976, Ser. No. 719,997
Int. Cl.² B62D *43/08*
U.S. Cl. 224—42.25 **12 Claims**



1. Apparatus for securing a spare tire comprising:

a baseplate;

first elongated means threaded into and rotatable relative to the baseplate at a first end and extending therefrom terminating at a second end for extending through a lug hole of an associated spare tire; and

second elongated means fixedly secured to the first elongated means including a portion extending substantially parallel with the first elongated means and through a hub hole of the spare tire for anti-rotating engagement with the hub upon rotation of the first elongated means.

4,076,159

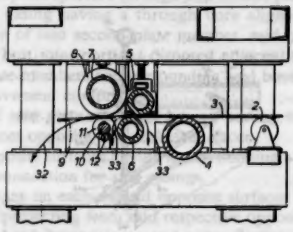
BREAKING FLAT GLASS INTO CULLET

Joseph Farragher, Southport, England, assignor to Pilkington Brothers Limited, St. Melens, England

Filed Oct. 18, 1976, Ser. No. 733,720
Claims priority, application United Kingdom, Oct. 29, 1975, 44693/75
Int. Cl.² C03B *33/02*
U.S. Cl. 225—3 **12 Claims**

1. A method of breaking flat glass into cullet, comprising supporting and advancing the flat glass and bending the glass

as it is advanced to apply a breaking stress across the glass about a first axis, and simultaneously applying breaking stresses



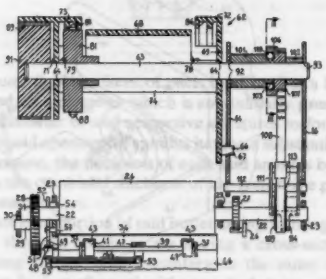
to the bent glass at a series of locations across the bent glass about an axis substantially orthogonal to said first axis.

4,076,160

PAPER AND CONTINUOUS-FORM FEED SYSTEM FOR A DESK-TOP PRINTING ELECTRONIC CALCULATING MACHINE

Bruno Azzalin, and Francesco Bettini, both of Ivrea (Turin), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Sep. 7, 1976, Ser. No. 720,936
Claims priority, application Italy, Sep. 11, 1975, 69259/75
Int. Cl.[2] B41J *11/34*
U.S. Cl. 226—82 **7 Claims**



1. A continuous-form feed system for a desk-top printing electronic calculating machine, comprising a platen, a pin element spaced from the platen and rotatable for driving perforated forms, a guide support for supporting the forms and guiding them to follow a path such that they engage around the pin element, a pair of guide elements disposed at the sides of the guide support and between which the continuous forms are, in use, laterally guided, and a locating element fixed to one of the guide elements adjacent a peripheral portion of the pin element for holding the forms in engagement with the pin element, wherein the guide support for the forms comprises a central part of substantially cylindrical form on which the continuous forms rest, in use, and wherein the locating element has the form of a concave circular sector substantially concentric with the central part and confronting the pin element so as to define a limited gap for the passage of the continuous forms.

4,076,161

STOCK FEEDER FOR PUNCH PRESSES AND THE LIKE

Albert W. Scribner, 6 Country Club Road, Darien, Conn. 06820

Filed May 10, 1976, Ser. No. 679,490
Int. Cl.[2] B65H *17/36, 17/44*
U.S. Cl. 226—146 **12 Claims**

1. A pneumatically operated feeder for intermittently advancing stock into a work station of a punch press or the like: comprising

a main frame;

a feed slide mounted for reciprocal movement on said main frame;

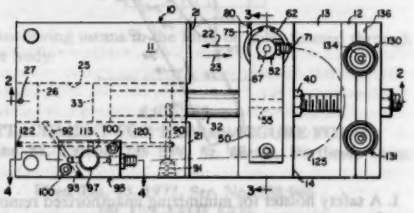
stock gripping means mounted on said feed slide;

fluid motor means for actuating said feed slide and stock gripping means;

valve means for controlling the operation of said fluid motor means; and

at least one stock braking means adapted to continuously apply a frictional drag force to a longitudinal corner edge portion of said stock being moved through said feeder;

said stock braking means including at least one yieldably biased member that is mounted so as to be capable of a small amount of swinging movement about an axis that is substantially parallel to the longitudinal axis of said stock so that said biased member engages essentially only a longitudinal side corner of said stock and applies substantially equal braking forces against movement of the stock in either longitudinal direction through the feeder.



5. A pneumatically operated feeder for intermittently advancing stock into the work station of a punch press or the like: comprising

a main frame;

a feed slide mounted for reciprocal movement on said main frame;

a first double-acting fluid motor means for actuating said feed slide, the rod end of said fluid motor means being adapted to be continuously supplied with pressure fluid;

stock gripping means mounted on said feed slide;

said stock gripping means including a gripper bar that is pivotally secured at one end thereof to said feed slide;

a second fluid motor means carried by said feed slide and adapted to actuate the other end of said gripper bar, a portion of said bar intermediate the said ends thereof being adapted to engage and grip the stock to be advanced by said feeder and to afford the bar gripping action with a mechanical advantage; and

valve means for controlling the operation of said fluid motor means.

4,076,162

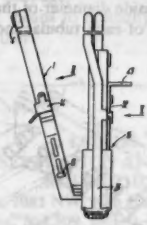
SURGICAL INSTRUMENT FOR SUTURING VESSELS WITH METAL STAPLES

Nikolai Nikolaevich Kapitanov, 8 ulitsa Oktyabrskogo polya, 5, kv.9; Vladimir Vasilievich Ippolitov, ulitsa Lavochkina, 6, korpus 2, kv. 143; Galina Dmitrievna Andreeva, Fedoskinskaya ulitsa, 3, kv. 33; Natalya Petrovna Petrova, 1 Novokuznetskaya ulitsa, 4, kv. 40, and Vladimir Semenovich Rabotnikov, Profsojuznaya ulitsa, 71, kv.65, all of Moscow, U.S.S.R.

Filed Jul. 9, 1976, Ser. No. 703,921
Claims priority, application U.S.S.R., Jul. 11, 1975, 2166201
Int. Cl.[2] A61B *17/11, 17/04*
U.S. Cl. 227—019 **2 Claims**

1. An improved surgical apparatus for suturing together vessels of the same or different diameters end-to-end or end-to-side or of suturing a patch on a vessel with metal staples in a single stroke or operation comprising: an anvil having two halves hinged to each other with provision for being joined

together and disjoined; a working head at one end of said anvil formed when its halves are joined together, and having a through hole for the passage of the vessel to be sutured; a bell mouth at one end of said working head for stretching the vessel to be sutured thereon, said working head of said bell mouth being of a shape in section, as a polygon elongated in the direction of its two opposite apices lying on the split line of the working head; recesses for clinching the staple ends on the outer surface of said bell mouth; catches for securing the edges of the vessel stretched over said bell mouth, mounted on said anvil; a staple element comprising two L-shaped plates hinged



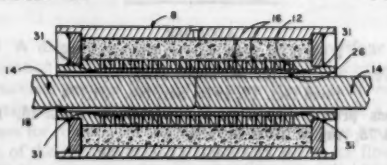
to each other and encompassing said working head of the anvil from the outside; means for fastening said plates on said anvil; magazines with slots for staples are provided at the ends of said plates against said bell mouth of the working head so that the slots with staples are disposed against said recesses on the bell mouth and supply said staples simultaneously to all sides of the elongated polygon head of said said bell mouth; and tappets for said staples, situated in slots in said magazines; and lever-type handles for actuating or moving the tappets to suture a vessel in one operation; whereby resetting of the parts of said apparatus or changing of said magazines is not required.

4,076,163

COUPLER DEVICE

Edvard Grande, 506 Highland Drive, Beckley, W. Va. 25801

Filed Aug. 13, 1976, Ser. No. 714,102
Int. Cl.² B23K *23/00*
U.S. Cl. 228—56 **4 Claims**



1. An improved thermite-type coupler for the splicing of bar-like structures such as reinforcement bars, of the type having an outer sleeve; an inner sleeve located within said outer sleeve; two collar members, each joining one end of said outer sleeve to one end of said inner sleeve; the region defined between said inner sleeve and said outer sleeve containing a thermite-type mixture and the region within said inner sleeve forming an annular space utilized for insertion of the ends of two bar-like sturctures, including means for igniting said thermite-type mixture and means for allowing the reaction products of the thermite-type mixture after it is ignited to enter said annular space under pressure so as to cause upon solidification of the reaction products, splicing of said bar-like structures, wherein the improvement comprises:

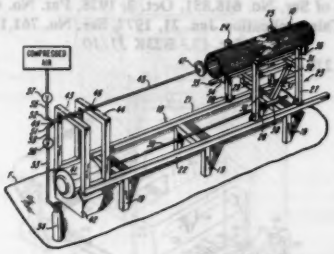
an inner sleeve having a multiplicity of perforations therethrough distributed over a substantial portion of its surface, each of said perforations being of a size sufficiently large to allow said reaction products to flow therethrough and of a size sufficiently small to cause the pressure of said activated thermite reaction products as they enter the annular space to be substantially lower than the pressure of said reaction products in the region between the inner and outer sleeves, each of said perforations being tapered so as to have a decreasing cross-sectional area in the vicinity of said annular space.

4,076,164

PRE-BLISTERING OF BRAZE JOINTS

Ivan Gene Freshcorn, Kenton, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio

Filed Apr. 21, 1977, Ser. No. 789,495
Int. Cl.² B23K *31/00, 1/04*
U.S. Cl. 228—103 **10 Claims**



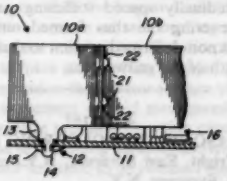
1. In the art of brazing metallic parts using a braze alloy to bond the parts together along a braze joint, the steps of subjecting a brazed joint to a relatively high and rapid temperature rise inducing blistering at locations of imperfect braze, and removing material loosened as a result of blistering.

4,076,165

MOUNTING ARRANGEMENT FOR CHASSIS AND PRINTED CIRCUIT BOARD WITH METHOD OF ASSEMBLY

Leonard Latasiewicz, Hoffman Estates, and Peter Franklin Stultz, Des Plaines, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 3, 1976, Ser. No. 692,615
Int. Cl.² H01L *3/34*
U.S. Cl. 228—136 **4 Claims**



1. A method of attaching an insulated circuit board to a metal chassis and carrying the combination on a conveyor mechanism, comprising the steps of:

forming a plurality of apertures in the circuit board;

providing solder receptive areas adjacent each circuit board aperture;

inserting component leads in certain ones of said board apertures;

forming projections on an edge of the chassis, the projections having a shoulder portion adjacent the chassis edge and a body portion smaller in cross-section than said shoulder portion, said body portion having a twistable end portion;

inserting the body portions of the chassis projections into certain other ones of the apertures in the circuit board;

twisting the end portions of the chassis projections for loosely retaining the circuit board;

conveying the chassis and circuit board in suspension for soldering;

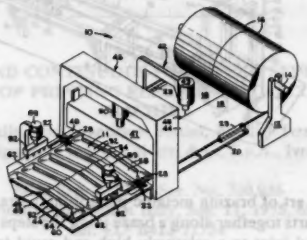
soldering the twisted end portions of the chassis projections and the component leads to the adjacent solder receptive areas on the circuit board.

4,076,166

ROOF FOR RAILWAY CAR AND METHOD OF MAKING SAME

Robert J. Austill, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 618,851, Oct. 2, 1975, Pat. No. 4,020,603.
This application Jan. 21, 1977, Ser. No. 761,178
Int. Cl.² B23K *31/10*
U.S. Cl. 228—157 **8 Claims**



1. A method of manufacturing a one piece roof from two longitudinally elongated webs of sheet metal for installation as a unit on the upper side plates and end plates of the walls of a railway car, said method comprising the steps of: drawing two elongate flat webs of sheet metal in abutting relation along a given path; welding the abutting longitudinal edges between said webs together at a welding station forming a seam as the webs are drawn along said path to form a one-piece sheet approximately the width of a railway car; forming a gable cresting substantially along the seam; transversely deforming a selected longitudinal area of said sheet at a location closely spaced from said welding station for providing a stiffening panel offset from the normal plane of the sheet; repetitively advancing and deforming said sheet to form a plurality of integral longitudinally spaced stiffening panels therein; and transversely severing the thus formed unitary gabled roof along a line in a non-deformed portion so that the roof approximates the length of the railway car.

4,076,167

ULTRASONIC DIP SOLDERING PROCESS

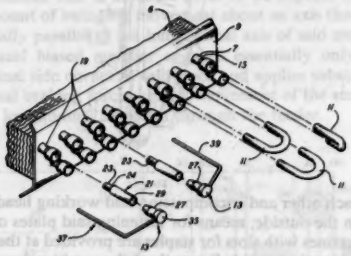
William E. Wright, East Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,299
Int. Cl.² B23K *3/00*
U.S. Cl. 228—173 F **1 Claim**

1. A process for relieving the interior air pressure of a heat exchanger fluid circuit of a heat exchange coil during a soldering operation, the circuit including a plurality of heat exchange tubes having open ends connected by return bends prefitted over the open ends and the circuit terminating in open-ended tubular members having an inner surface, wherein the return bends prefitted on the open ends of the heat exchange tubes of the circuit are immersed in the bath of molten solder, the process comprising the steps of:

inserting the plug member of process snorkels into the open ends of the tubular members; the plug members formed of a material incompatible with the solder in the solder bath for inhibiting the adherence of solder to said plug members including outer configurations dimensioned to enable the plug members to telescope into the open-ended tubular members terminating the circuit in sliding engagement with the inner surfaces of the tubular members, a forward surface exposed to the interior of the circuit when the plug member is telescoped into the open end of the tubular member, a bore extending from said surface into the plug member, and a tubular member extending from the bore, the tubular member being dimensioned to place the bore in communication with the atmosphere when the circuit is immersed in the solder bath;

expanding the ends of the tubular members by forcibly assembling the plug members having a greater outside diameter than the inside diameter of the tubular members such that a portion of each tubular member assumes the



configuration of the respective plug member, said step of expanding occurring simultaneously with the step of inserting the plug member;

immersing the portion of the heat exchange coil having the open ends of the heat exchange tubes with the prefitted return bends, and the open-ended tubular members with the inserted process snorkels, into the solder bath, the process snorkels relieving the internal pressure in the circuit enabling the molten solder to flow into the joints between the heat exchange tubes and return bends;

removing the immersed portion of the heat exchange coil immersed from the solder bath; and

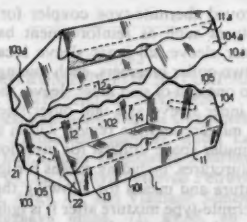
removing the process snorkels from the tubular members.

4,076,168

CARTON FOR FOOD PRODUCTS

Luigi Ferri, Via Belfiore 24, Turin, Italy

Filed Oct. 12, 1976, Ser. No. 731,774
Claims priority, application Switzerland, Oct. 15, 1975, 013480/75; Aug. 6, 1976, 010114/76
Int. Cl.² B65D *43/22, 5/46*
U.S. Cl. 229—43 **6 Claims**



1. A hollow receptacle for the retail packaging of delicate food products, particularly fresh confectionary, comprising

two separate essentially identical half-receptacles which are superimposable above one another to make a package with a chamber for the articles therein, and which may be separately used before or after packaging of the articles in form of trays for display and respectively support of food products, separately, on each half-receptacle;

wherein each half-receptacle comprises a bottom;

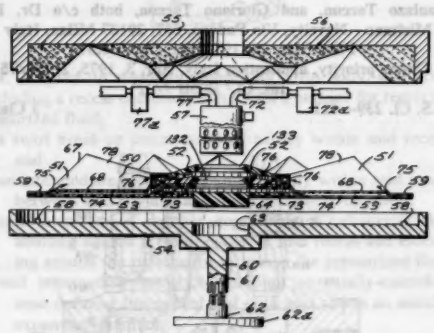
a first pair of opposed walls, said walls being provided with connecting tongues;
and a second pair of opposed walls having a height greater than that of first walls;
said connecting tongues on said first pair of walls being formed with engagement areas to fit said half-receptacles together
said second walls being capable to engage one over another by reciprocal telescoping fit when said half-receptacles are arranged one turned over another to form an internally hollow package;
and connecting means to mutually connect the connecting tongues together.

4,076,169

CENTRIFUGE SEPARATION AND WASHING DEVICE AND METHOD

Charles A. Schlutz, 7081 NW. 10th Place, Plantation, Fla. 33313

Division of Ser. No. 513,509, Oct. 9, 1974, Pat. No. 3,982,691. This application Aug. 16, 1976, Ser. No. 714,651
Int. Cl.² B04B *11/02, 15/06*
U.S. Cl. 233—14 R **20 Claims**



1. A disposable structure for use in a centrifuge for the separation and washing of liquid suspended finely-divided particulate material wherein the centrifuge includes means for containing a quantity of liquid suspended material, a rotation means for rotating the suspended material about a longitudinal axis of the rotation means, and control means for flowing the suspended material and a wash liquid into and out of the centrifuge comprising:

1. a disposable enclosure means for enclosing a quantity of liquid suspended material and adapted and configured to be releasably held by the rotation means in a manner that the enclosure means with liquid suspended material therein may be rotated by the rotation means, said enclosure means having a plurality of angularly shaped material receiving means in fluid communication with each other and evenly spaced about the longitudinal periphery of the enclosure means and forming a part of the enclosure means, said material receiving means having at least one pair of opposite wall portions which converge towards the longitudinal periphery of the enclosure means and thereby form a locus of maximum centrifugal force in the rotating enclosure at the apexes formed by the juncture of the converging wall portions;

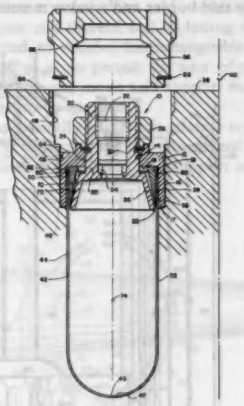
2. a plurality of disposable independent conduit means in fluid communication with each other, each with one end thereof in fluid communication with the said locus of maximum centrifugal force and the other end thereof in fluid communication with the control means.

4,076,170

TUBE CAP ASSEMBLY FOR PREPARATIVE CENTRIFUGE ROTORS

Steven John Chulay, Los Altos, and Victor John Grilli, Mountain View, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 18, 1977, Ser. No. 788,484
Int. Cl.² B04B *15/00*
U.S. Cl. 233—26 **10 Claims**



1. A centrifuge test tube cap assembly for a thin test tube, said assembly comprising:

a crown member with a depending outer flange forming a generally cylindrical cavity, said crown member having a central aperture;
a stem member movably mounted within said aperture of said crown member, said stem member having a biasing end positioned within said cylindrical cavity; and
a bushing member positioned within said cavity between said biasing end of said stem member and said depending outer flange of said crown member, said bushing member having a frustoconical interior surface, the top edge portion of said test tube being positioned within said cavity between said depending flange and said bushing member, said biasing end of said stem member having a diameter generally greater than the largest diameter of said frustoconical interior surface of said bushing member, movement of said stem member in a first direction causing said biasing end to force said bushing member to tightly secure said test tube against the interior surface of said depending flange and movement of said stem member in a second direction opposite said first direction causing said biasing end to release said bushing member allowing said top edge portion of said test tube to be released from said tube cap assembly.

4,076,171

DAMPER CONTROL APPARATUS

Paul F. Swenson, 25525 Edgecliff Drive, Euclid, Ohio 44132

Filed Jul. 12, 1976, Ser. No. 704,548
Int. Cl.² F23N *3/02*
U.S. Cl. 236—1 G **14 Claims**

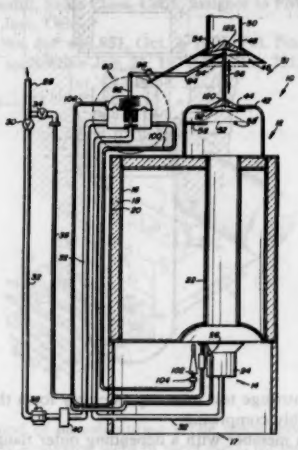
1. In a heating apparatus of the type including a fluid fuel burner, a flue duct for discharging the products of combustion produced by said burner, a supply line for supplying fluid fuel to said burner and a valve means operable between open and closed positions for controlling the flow of fuel through said supply line to said burner, the improvement comprising:

at least one damper means movable between open and closed positions for controlling flow through said flue duct;
expansible chamber fluid motor means connected to said flow control damper means for moving said damper

means to an open position when pressurized and to a closed position when unpressurized; and,

connection means for pressurizing said expansible chamber motor means whenever said valve means is in an open position, and said expansible chamber motor means including control means for preventing the flow of fuel to said burner until said damper means are in an open position.

10. In a heating apparatus of the type including a fluid fuel burner, a flue duct for discharging the products of combustion produced by said burner and a valve means operable between



open and closed positions for controlling the flow of fuel through said supply line to said burner, the improvement comprising:

at least one damper means movable between open and closed positions for controlling flow through said flue duct;

fluid motor means connected to said damper means for moving said damper means to an open position and to a closed position; and,

connection means for pressurizing said fluid motor means whenever said valve means is in an open position, and control means for preventing the flow of fuel to said burner until said damper means are in an open position.

4,076,172

TEMPERATURE RESPONSIVE VALVE ASSEMBLY

Masami Inada, Toyoake, and Kazuhiko Kitamura, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 17, 1976, Ser. No. 751,720
Claims priority, application Japan, Jan. 12, 1976, 51-003069
Int. Cl.² G05D *23/10*
U.S. Cl. 236—48 R **3 Claims**

1. A temperature responsive valve assembly comprising:

a body havng an inlet port and first and second outlet ports,

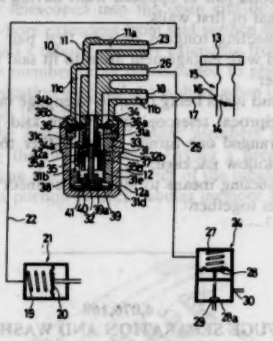
a thermostatic bimetal disk disposed within said body and responsive to a variation in temperature to change the curvature thereof from a first position to a se ond position,

a valve spool following the movement of said bimetal disk and having first and second valve portions,

an adjusting member secured to said valve spool at a proper position and arranged to be engageable with said bimetal disk,

a first seat member disposed within a first passage between said inlet port and said first outlet port, said first seat member engageable with said first valve portion of said valve spool to thereby control said first passage, and

a second seat member disposed within a second passage between said inlet port and said second outlet port, said second seat member engageable with said second valve portion of said valve spool to thereby control said second



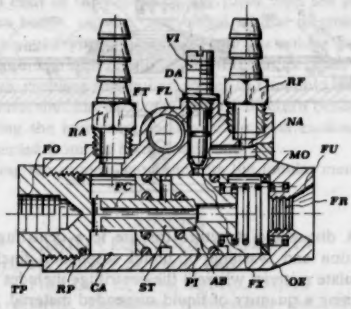
passage, and said second seat member being adjustably threaded with said body.

4,076,173

ATOMIZER

Danizzo Taccon, and Gloriano Taccon, both c/o Dr. Ing. Misitano - Novelty, Via Padova, 217, 20127 Milan, Italy

Filed Mar. 26, 1976, Ser. No. 670,871
Claims priority, application Italy, Apr. 3, 1975, 21954/75
Int. Cl.² B05B *7/12*
U.S. Cl. 239—411 **3 Claims**



1. An atomizer comprising a chamber, a first inlet for admitting air under pressure to said chamber, a piston mounted in said chamber for displacement by said air under pressure from a rest position to an operative position, spring means operable to urge said piston to the rest position, an outlet to said chamber, an air passage through said piston maintaining said outlet in constant communication with said air inlet, a second inlet for admitting fluid to be atomized to said chamber at a location at which it is closed by said piston in the rest position, valve means for controlling the flow of fluid to be atomized to said second inlet and a fluid passage in said piston operable in the operative position of said piston to place said second inlet in communication with said air passage to entrain fluid to be atomized in air flowing through said air passage when said control valve is open, a fixed stem extending within said chamber and into said piston whereby the piston is displaced on said stem between said rest position and said operative position, and a passageway through said stem maintaining said air passage through said piston in communication with said first inlet, said stem engaging said piston in the rest position to limit displacement of said piston under the influence of said spring means, the said fluid passage including a radial passage formed in said piston and opening to the exterior of said piston at a first loca-

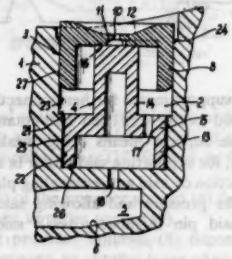
tion in communication with said second inlet in the operative position of said piston and closed by the wall of said chamber in the rest position of said piston, said radial passage opening to the air passage through said piston at a second location at which it is closed by said stem in the rest position of said piston.

4,076,174

SPRAY NOZZLE FOR DISPENSING CONTAINERS

Günter Melchior Volgel, and Wendelin Velten, both of Nurnberg, Germany, assignors to Aerosol Inventions & Developments S.A. Aid SA, Switzerland

Filed Mar. 26, 1976, Ser. No. 670,860
Int. Cl.² B05B *1/34*
U.S. Cl. 239—492 **10 Claims**



1. A spray-tip assembly comprising a tip body, said body including a recess communicating with a passage for receiving presurized fluid;

a swirl break-up insert mounted axially within said recess; and

an intermediate member mounted axially within said recess between said passage and said swirl break-up insert.

said intermediate member comprising a cylindrical skirt abutting against a base portion of said recess and extending around the passage for receiving the pressurized fluid,

said intermediate member including an axially-extending nose defining thereabout and with said recess an annular expansion chamber,

said swirl break-up insert including a depending skirt at least partially limiting said expansion chamber,

said nose having an upper end surface abuttingly-engaging an inner confronting surface of said swirl break-up insert and including portions cooperating therewith and defining a collecting-chamber communicating with channels tangential with respect to an outlet orifice in said swival break-up insert,

said intermediate member including an intermediate shoulder between said cylindrical skirt and said

nose, and at least one metering-orifice in said shoulder communicating with said expansion chamber.

4,076,175

ADJUSTABLE INDUSTRIAL PAINT SPRAYER

Walter J. Bert, 213 N. Emerald Drive, McHenry, Ill. 60050

Filed Aug. 24, 1976, Ser. No. 717,228
Int. Cl.² B05B *13/02*
U.S. Cl. 239—532 **3 Claims**

1. Industrial spraying apparatus for applying paint to an overhead pipe or the like, comprising:

a. support means including a pair of spaced apart contoured support members adapted to extend in surrounding relation to the pipe to be sprayed and having a passageway contained therein,

b. nozzle means including a nozzle mounted on each of said support members in communicating relation with said passageway and directed in the direction of the pipe so as to obtain an application of the paint onto the pipe,

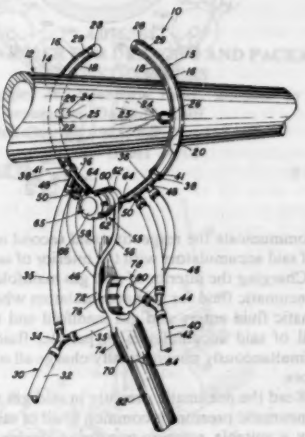
c. paint supply means connected to each of said support members and communicating with each said passageway,

d. air supply means connected to each of said support members adjacent said paint supply means and communicating with each said passageway,

e. mounting means for pivotally connecting said support members at substantially one end thereof to provide angular positionment so as to obtain an adjustment between said nozzles such that pipes of various sizes may extend therebetween for painting,

f. extension means connected to said mounting means at substantially one end thereof and including an extension member adapted to receive interchangeable handles of various lengths so as to permit the user of the spraying apparatus to retain and move said support members relative to the pipe to be sprayed,

g. locking means pivotally adjustable relative to said mounting means so as to permit angular adjustment of the interchangeable handles relative to said support means,



h. said mounting means includes

i. a bracket,

ii. a flanged member extending from one end of each of said support members in overlapping relationship to said bracket, and

iii. coupling means for releasably retaining said bracket and said flanged members in fixed relationship to each other,

i. said support means includes

iv. an extension member extending from one end of each said support member,

v. a neck portion extending from each said flanged member and adapted to be received by said extension member,

vi. means connecting said paint supply means to each said extension member, and

vii. means connecting said air supply means to each said extension member.

4,076,176

GAS DISTRIBUTION MANIFOLD ARRANGEMENT AND METHODS FOR USE WITH PLURALITY OF HYDROPNEUMATIC HYDRAULIC ACCUMULATORS

James D. Torrence, Appleton, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

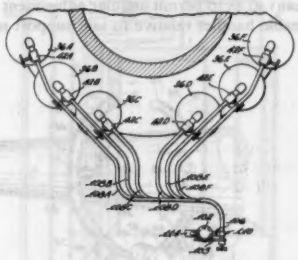
Filed Dec. 27, 1976, Ser. No. 754,623
Int. Cl.² B02C *2/00*
U.S. Cl. 241—30 **10 Claims**

9. The method of precharging with pneumatic fluid to an equal pneumatic pressure a plurality of associated hydropneu-

matic hydraulic accumulators of the type in which each of said accumulators is provided with a first inlet means for admitting hydraulic fluid to the respective accumulator and with a second inlet means for admitting pneumatic fluid to the respective accumulator, and in which said second inlet means of each of said accumulators is fluidly connected by a corresponding separate conduit means to a gas manifold common to all of said accumulators, and in which a separate corresponding selector valve is interposed in series with each said separate conduit means whereby to control pneumatic fluid communication through the respective conduit means between said gas manifold and the second inlet means of the corresponding accumulator, which method comprises the steps of:

(1) Opening said second inlet means of each of said accumulators;

(2) Opening each of said selector valves whereby to fluidly



communicate the respective said second inlet means of all of said accumulators with the interior of said gas manifold;

(3) Charging the interior of said gas manifold with a suitable pneumatic fluid for said accumulators whereby said pneumatic fluid enters said gas manifold and thence passes to all of said accumulators in parallel fluid flow paths to simultaneously pneumatically charge all of said accumulators;

(4) Read the pneumatic pressure in said gas manifold, which pneumatic pressure is common to all of said accumulators, by a suitable pressure-measuring device, and when the measured pneumatic pressure reaches a predetermined desired value, discontinue charging said manifold with said pneumatic fluid;

(5) Close all of said selector valves, thereby pneumatic fluidly isolating all of said pneumatically charged accumulators from each other and from said gas manifold.

4,076,177

PULVERIZING METHOD AND APPARATUS

Yoshio Hirayama, Zushi; Kanichi Ito, Yokohama; Ryoichi Takeuchi, Kamakura; Masao Nomoto, Tokyo, and Tomoyuki Shiina, Yokohama, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Jun. 18, 1976, Ser. No. 697,734

Claims priority, application Japan, Jun. 24, 1975, 50-77981; Feb. 17, 1976, 51-16099

Int. Cl.² B02C *23/04*

U.S. Cl. 241—32 **7 Claims**

1. A drum-type pulverizer for pulverizing a mixture of materials, said pulverizer comprising:

a rotatable cylindrical screen having a plurality of ridge projections on the inside surface thereof and having inlet opening and outlet openings;

a rotatable shaft centrally and coaxially extending through said cylindrical screen;

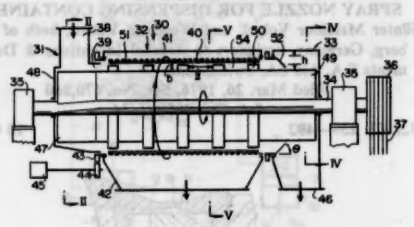
a plurality of anti-entangling plates, each radially mounted on said shaft;

feed means at said inlet opening for advancing the material to be pulverized from said inlet opening toward said outlet opening;

a frusto-conical shaped weir attached at the outlet opening of said cylindrical screen restricting the area of said opening;

a plurality of beaters, each beater being radially mounted on the edge of one of said anti-entangling plates;

at least one pin member pivotally connecting at least one of said beaters to said anti-entangling plate associated therewith; and



breakable support means further connecting said pivotally connected beater and said anti-entangling plate, said breakable support means being weaker than said pin member, for supporting said beater in a radially projecting direction on said anti-entangling plate and for breaking under pressure and allowing said beater to pivot about said pin member toward said anti-entangling plate.

4,076,178

DEVICE FOR CONTROLLING FLOW FROM THE DISCHARGE END OF A TUBULAR BALL MILL OR THE LIKE

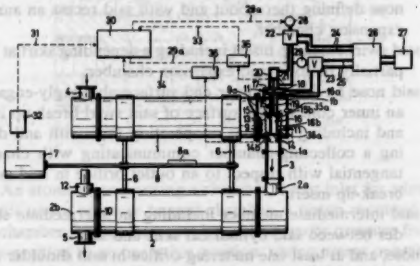
Friedhelm Haude, Cologne, Germany, assignor to KHD Industrienlagen AG

Filed Jun. 2, 1976, Ser. No. 692,220

Claims priority, application Germany, Jun. 6, 1975, 2525242

Int. Cl.² B02C *17/18*

U.S. Cl. 241—33 **14 Claims**



1. A device for controlling flow from the discharge end of associated apparatus such as a tubular ball mill or the like, wherein treated fluent material is received in an accumulation chamber having a lower discharge outlet, the device comprising:

a vertically contractible and expandable hollow body having a metering valve disk on its upper end and a discharge outlet controlling valve disk on its lower end, said valve disks having material metering ports communicating through said hollow body;

means for adjusting the level of the upper valve disk to control the accumulation level of material while the lower of the disks closes the discharge outlet except for the metered flow through said metering ports;

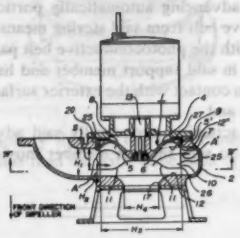
and means for independently raising said lower valve disk to open the discharge outlet for bypassing of the treated material into the discharge outlet.

4,076,179

CENTRIFUGAL SEWAGE PUMP

Syozo Tsukube, Ikoma, Japan, assignor to Kabushiki Kaisha Sogo Pump Seisakusho, Osaka, Japan

Filed Apr. 22, 1976, Ser. No. 679,464
Int. Cl.² B02C 23/36
U.S. Cl. 241—46.11 8 Claims



1. A centrifugal sewage pump which comprises a semi-open impeller (1) with a disk-like shroud (4) fixed on a pump shaft (13) and plural impeller vanes (10) formed on the shroud (4) in one body,

a front face (5) of the impeller shroud (4) facing water passages between impeller vanes (10),

front face (5) provides hollows (8) depressing smoothly backward between an annular inner edge (6) and annular outer edge (7) thereof;

a shroud outer periphery (9) covered with a shroud ring (20) of a pump casing (2);

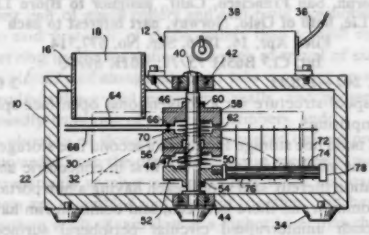
radial flow impeller vanes (10) each having a vane outer periphery (25) extending forward from an outer periphery (7) of the shroud front face (5), said vane having a smooth front edge (11) running from a front end (26) of said vane outer periphery to the front face inner edge (6), there being a clearance (H_2) between a front edge (11) of the radial flow impeller vanes (10) and a casing inner face (12) located in front of the impeller (1) and surrounding a suction port (17) for passing solid matter, and a height (S) of the vane outer periphery (25) being 30–70% of a water passage clearance (H_1), an axial distance between casing inner faces (12) (12′) at an impeller outlet in a casing 2, said piump being further characterized in that among portions of the shroud front face (5) divided by the radial flow impeller vanes (10), at least two portions (5′) and (5′) located at symmetrical positions have no or little backward depression.

4,076,180

FOOD SHREDDING AND DICING MACHINE

William Y. Liu, 286 Clinton Ave., Brooklyn, N.Y. 11205

Filed Mar. 9, 1976, Ser. No. 665,169
Int. Cl.² B02C 18/10, 18/18
U.S. Cl. 241—154 8 Claims



1. A food dicing and shredding machine, comprising:

a housing,

a motor attached to the housing,

a shaft extending vertically from the motor,

a control disk vertically adjustably attached to the shaft,

a parallel cutting blade attached to the shaft above the control disk,

the shaft rotatably supported by the housing,

means of introducing a piece of food through an upper surface of the housing down on to the control disk, and

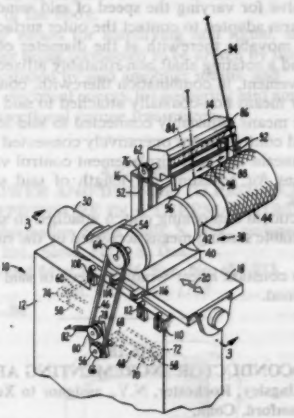
an exit opening formed in a side of the housing, whereby the piece of food may be sliced by the parallel cutting blade while resting on the control disk when the shaft is rotating and a piece sliced from the piece of food may be discharged through the exit opening.

4,076,181

PRECISION WINDER FOR DRAWING AND PACKAGING SYNTHETIC FIBERS

Charles H. Coggin, Jr., Glendora, Calif., assignor to Kaiser Glass Fiber Corporation, Oakland, Calif.

Filed Oct. 22, 1976, Ser. No. 735,000
Int. Cl.² B63H 54/02
U.S. Cl. 242—18 G 9 Claims



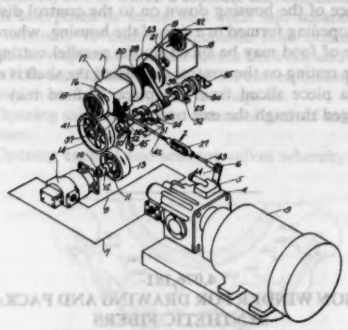
1. A winder for directly drawing glass fiber from an orifice plate to form a precision wound package, said winder comprising: a traverse mounted in a fixed position, said traverse having a follower disposed for back and forth movement thereacross in a generally rectilinear path; a spindle disposed in parallel relationship to the rectilinear path of the follower; means mounting the spindle for rectilinear movement toward and away from the traverse while maintaining the relative parallel relationship of the spindle with the rectilinear path of the follower; a package engaging member mounted on the follower for engagement with the peripheral surface of a package of windings on the spindle and movement relative to the traverse in response to changes in the diameter of such a package; a metallic element mounted for movement with the package engaging member; an oscillator carried by the traverse to sense the position of the metallic element; and, motion imparting means coupled to the spindle to move the spindle on the mounting means therefor and away from the traverse, said motion imparting means being operatively associated with the oscillator to maintain a substantially constant distance between the peripheral surface of windings on the spindle and the traverse.

4,076,182

VARIABLE SPEED WIRE SPOOLER

Harold W. Stites, Raytown, Mo., assignor to Armco Steel Corporation, Middletown, Ohio

Filed Jan. 10, 1977, Ser. No. 757,786
Int. Cl.² B65H *59/00*
U.S. Cl. 242—45 **10 Claims**



1. In winding apparatus of the type having driving means for operating a pump, winding means responsive to said driving means for winding material in a coil on a spool, a displacement control valve for varying the speed of said winding means, a swinging arm adapted to contact the outer surface of said coil and to be movable therewith as the diameter of said coil increases, and a rotating shaft non-rotatably affixed to said arm, the improvement, in combination therewith, comprising:

(a) lever means non-coaxially attached to said shaft;

(b) slide means adjustably connected to said lever means;

(c) speed control means operatively connected between said slide means and said displacement control valve;

(d) means for adjusting the length of said speed control means;

(e) a frictional dampening clutch attached to said shaft; and

(f) adjustable sensing means activated by the rotation of said shaft,

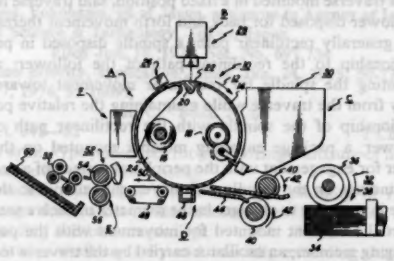
whereby a constant linear winding speed of said material may be maintained.

4,076,183

PHOTOCONDUCTOR INCREMENTING APPARATUS

William Kingsley, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 18, 1977, Ser. No. 769,984
Int. Cl.² B65H *17/02, 75/02*
U.S. Cl. 242—67.3 R **9 Claims**



1. An apparatus for incrementing a photoconductive belt to advance unused portions thereof to an operative location as used portions thereof advance to an inoperative location, including:

a movable support member having an interior chamber with the exterior surface thereof defining a path for entraining the photoconductive belt thereabout, said support member having an aperture between the exterior surface thereof and the interior chamber;

means, disposed in the chamber of said support member, for storing the unused portions of the photoconductive belt;

means, disposed in the chamber of said support member, for receiving the used portions of the photoconductive belt;

means for advancing automatically portions of the photoconductive belt from said storing means to said receiving means with the photoconductive belt passing through the aperture in said support member and having one surface thereof in contact with the exterior surface of said support member; and

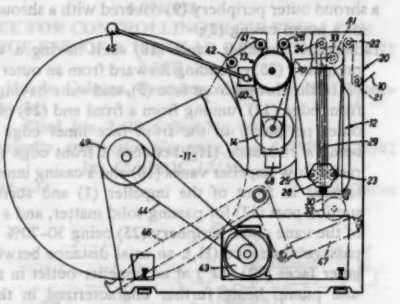
means for actuating periodically said advancing means in response to said support member moving a pre-selected interval.

4,076,184

APPARATUS FOR REELING WEB- OR STRAND-LIKE MATERIAL

John Henry Morgan, Dursley, England, assignor to John Morgan Printing Machinery Ltd., England

Filed Apr. 15, 1976, Ser. No. 677,137
Claims priority, application United Kingdom, Apr. 17, 1975, 15915/75
Int. Cl.² B65H *23/16*
U.S. Cl. 242—75.3 **10 Claims**



1. An apparatus for reeling web or strand-like material comprising sensing means for sensing the tension in the material to be reeled, a non-driven control cylinder separate from said sensing means and with a non-slip surface around which the material is to pass, brake means acting on said sensing means to provide actuation of said brake means in dependence thereon.

4,076,185

DUPLEX SPOOL FOR AN OPEN FACE SPINNING REEL

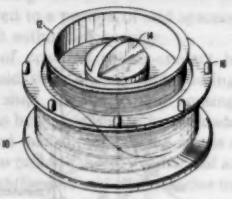
Thor Dorph, San Francisco, Calif., assignor to Bjorn Lie and Gina Lie, both of Oslo, Norway, part interest to each

Filed Apr. 16, 1976, Ser. No. 677,714
Int. Cl.² B65H *75/14;* A01K *89/00*
U.S. Cl. 242—118.41 **2 Claims**

1. A spool structure for a conventional open face spinning reel comprising:

a first main line storage spool and a second line storage spool on the axial outer face of the first in concentric abutting relation thereto, said spools each having a hub portion and a common rim there between, said common rim having a smooth uninterrupted circular peripheral surface, the other rim of said second spool being of less diameter than said common rim and the line capacity of said second spool being only a few turns; and

means defining a plurality of equally circumferentially spaced knobs extending axially of said common rim adja-



cent the periphery thereof, the axial dimension of said knobs being less than the axial dimension of said spool.

4,076,186

MAGNETIC TAPE CASSETTES

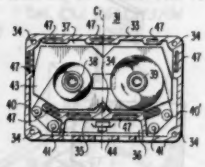
Kengo Oishi, and Osamu Suzuki, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 21, 1976, Ser. No. 734,692

Claims priority, application Japan, Oct. 23, 1975, 50-144708[U]

Int. Cl.² G11B *23/10*

U.S. Cl. 242—199 **5 Claims**



1. In a magnetic tape cassette including upper and lower rectangular case members having peripheral inner walls secured together at their corners to define a hollow interior region therebetween, partition means within said interior region defining therein a recording and reproducing area and a tape storage area, a pair of parallel, rotatable reels mounted in said storage area and spaced from each other, a first pair of parallel, flanged rotary guide rollers mounted in said storage area on opposite sides of said recording and reproducing area, and a magnetic recording tape wound on and extending between said reels and guided in a path of travel through said recording and reproducing area by said guide rollers, the improvements characterized by:

a. a second pair of parallel, flanged rotary guide rollers individually mounted in said storage area between said first pair of guide rollers and said reels, positioned closer to said first pair of guide rollers than to said reels, and serving to further define said path of travel of said tape,

b. a plurality of elongated insert tabs mounted on and protruding along said peripheral walls, and projecting inwardly from one of said case members, and

c. a plurality of elongated slots mounted on and projecting inwardly from the other of said case members, positioned to matingly receive said insert tabs when said case members are assembled and secured together, and having the bottom walls of said slots at a higher level than the height of the inner walls of said case members whereby said engaged tabs and slots increase the rigidity of said cassette and maintain the parallelism of said reels and guide rollers.

4,076,187

ATTITUDE-CONTROLLING SYSTEM AND A MISSILE EQUIPPED WITH SUCH A SYSTEM

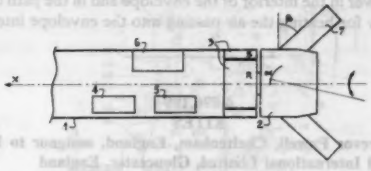
Pierre Metz, Paris, France, assignor to Thomson-Brandt, Paris, France

Filed Jul. 20, 1976, Ser. No. 707,029

Claims priority, application France, Jul. 29, 1975, 75 23642

Int. Cl.² F42B *13/30*

U.S. Cl. 244—3.23 **8 Claims**



1. A system for controlling the attitude of a cylindrical body moving in a fluid, capable of controlling the attitude of this body in roll, which comprises:

a finned rotary empennage concentric with the body;

a bi-directional torque transmitter providing a connection between the body and the empennage and acting on the empennage relative to the body;

an attitude detector means for producing a signal proportional to the divergence between the detected and desired attitudes of the body;

an amplifier means for amplifying said signal, said torque transmitter being connected to be driven by the amplified signal produced by said amplifier means; and

a source of electrical energy for powering said amplifier and said bi-directional torque transmitter.

4,076,188

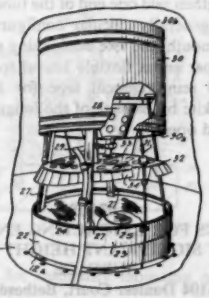
BLOWER AND BURNER TO PRODUCE SUPERPRESSURE IN A THERMAL AIRSHIP

Douglas B. Obermoller, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed May 19, 1976, Ser. No. 687,913

Int. Cl.² B64B *1/58*

U.S. Cl. 244—98 **11 Claims**



1. A thermal hot air airship comprising in combination:

a flexible elongate heated air lifting envelope aerodynamically shaped for horizontal flight providing a hull for the airship;

tail members on the aft end of the airship for controlling the horizontal flight;

a gondola carried below the hull for supporting a payload;

power propelling means on the airship for propelling the airship horizontally;

means defining a pressurizing inflation opening leading into the hull;

hot air pressure generating means comprising an integral blower and controlled burner means interiorly of the pressurizing inflation opening and on the interior of the envelope for pressurizing and inflating the soft envelope with heated air to supply substantially the entire lift during flight, said blower being positioned at the hull inflation opening for moving a flow of air through the hull opening for inflating the envelope with a superpressure, said controlled burner means being positioned downstream of the blower in the interior of the envelope and in the path of air flow for heating the air passing into the envelope interior.

4,076,189

KITES

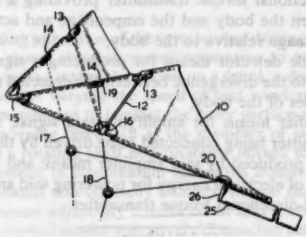
Peter Trevor Powell, Cheltenham, England, assignor to Peter Powell International Limited, Gloucester, England

Filed Jul. 16, 1976, Ser. No. 705,891

Claims priority, application United Kingdom, Jul. 16, 1975, 29844/75; Mar. 6, 1976, 9076/76

Int. Cl.² B64C *31/06*

U.S. Cl. 244—153 R **4 Claims**



1. The combination of a kite and a streamer for attachment to the kite in the form of an elongated, inflatable, flexible tube, the tube from which the streamer is formed being of constant cross section throughout its length, the tube having an open mouth at one end thereof and the other end of the tube being closed, reinforcement means in the form of a tape that is provided at said one end of the tube, the reinforcement means serving to strengthen said one end of the tube and to insure that it will adopt a generally circular configuration and thereby afford an open mouth, the kite comprising sheeting spread by a longitudinal spar and a flexible lateral spar, there being an opening in said reinforcement tape for attachment of the streamer to the kite by passage of the longitudinal spar of the kite through said opening.

4,076,190

APPARATUS FOR EXTRACTING ENERGY FROM WINDS AT SIGNIFICANT HEIGHT ABOVE THE SURFACE

Lambros Lois, 6104 Dunleer Court, Bethesda, Md. 20034

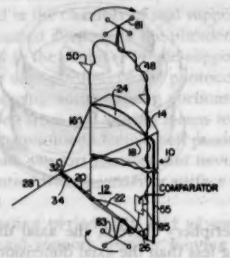
Filed Mar. 30, 1976, Ser. No. 671,944

The portion of the term of this patent subsequent to Dec. 9, 1992, has been disclaimed.

Int. Cl.² B64C *31/06*; F03D *9/02*

U.S. Cl. 244—153 R **7 Claims**

1. In apparatus for harnessing energy from atmospheric winds, comprising at least one floating sail, each sail being connected to a flexible line, the other end of each flexible line being wound upon a respective pulley for utilizing energy extracted from the wind by playing out each said flexible line and each said sail under the influence of the wind, the improvement comprising wind velocity gradient sensing means for sensing the wind adjacent the upper and lower edges of said sail, comparator means to compare the signal from said sensing means and to provide an indication of the direction in which



each sail should move to reach an altitude of highest wind velocity.

4,076,191

SPACECRAFT COMPONENT ROTATION MEANS

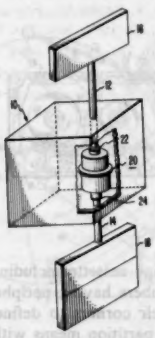
Derek Sidney Binge, Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 672,700

Claims priority, application United Kingdom, Apr. 29, 1975, 17784/75

Int. Cl.² B64G *1/10*; H02K *5/00*

U.S. Cl. 244—173 **10 Claims**



1. A solar array drive apparatus for rotating at least one array of solar panels in a spacecraft adapted for orbital operation, comprising:

a housing secured to a portion of said spacecraft;

a rotatable shaft within said housing;

a duplex pair of coacting rolling-contact bearing means secured to said shaft and to said housing to rotatably support said shaft relative to said housing, said duplex bearing means being adapted to be preloaded;

means to preload said duplex bearing means to a predetermined force to provide thereby radial and axial constraint and moment stiffness of said shaft relative to said housing;

a single rolling-contact bearing means secured to said shaft for rotatably supporting said shaft, said single bearing means adapted to be preloaded;

axially resilient support means having substantially no radial resilience secured to said single bearing means and to said housing;

means for elastically flexing said axially resilient support means to preload said single bearing means to provide a radial constraint of said shaft relative to said housing and thereby a rotatable support of said shaft in addition to said rotatable support by said duplex bearing means for increased moment stiffness of said shaft;

motor means for rotating said shaft; and

means for connecting said shaft to said array of solar panels.

9. A bearing and drive mechanism to rotate components in a spacecraft, comprising:

a housing secured to a portion of said spacecraft;

a rotatable shaft within said housing;

a duplex pair of coacting rolling-contact bearing means secured to said shaft and to said housing to rotatable support said shaft relative to said housing, said duplex bearing means being adapted to be preloaded;

means to preload said duplex bearing means to a predetermined force to provide thereby radial and axial constraint and moment stiffness of said shaft relative to said housing;

a single rolling-contact bearing means secured to said shaft for rotatably supporting said shaft, said single bearing means being adapted to be preloaded;

axially resilient support means having substantially no radial resilience secured to said single bearing means and to said housing; and

means for elastically flexing said axially resilient support means to preload said single bearing means to provide a radial constraint of said shaft relative to said housing and thereby a rotatable support of said shaft in addition to said rotatable support by said duplex bearing means for increased moment stiffness of said shaft.

4,076,192

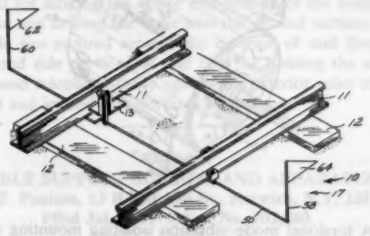
APPARATUS FOR DETECTING A HIGH FLANGE

Myron W. Hoge, 1345 N. Broad St., Fremont, Nebr. 68025

Filed Dec. 30, 1976, Ser. No. 755,528

Int. Cl.² B61L *13/04*

U.S. Cl. 246—247 **2 Claims**



1. An apparatus for detecting a high flange on the wheel of a railroad car as the wheel moves over a railroad track, the apparatus comprising:

a base means including a base member secured to the track and an upright member secured to said base member;

an L-shaped unit pivotally secured to said upright member proximate the track in a position to be displaced from a first position to a second position by a high flange, said L-shaped unit in said first position having a generally horizontal arm positioned to be generally in the path of said high flange and a generally vertical leg depending from said arm;

biasing means interconnected between said base means and said L-shaped unit for biasing said L-shaped unit to said first position; and

signal means including an elongated rod operatively connected to said L-shaped unit and affixed intermediate its ends to said upright member with one end of said rod extending laterally of one side of the track and the other end of said rod extending laterally of the other side of the track, and a pair of flags each secured to an end of said rod, wherein movement of said L-shaped unit from said first to said second position causes said rod to move with said flags giving a visual signal of the movement.

4,076,193

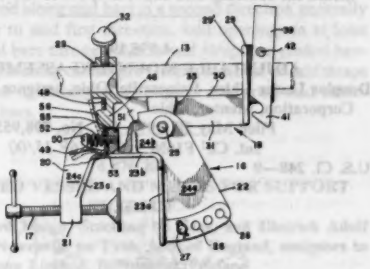
TRANSOM MOUNT FOR FISHING MOTOR

Lester C. Weaver, Fayetteville, Ark., assignor to Shakespeare of Arkansas, Inc., Fayetteville, Ark.

Filed Dec. 17, 1976, Ser. No. 751,468

Int. Cl.² B63H *21/26*

U.S. Cl. 248—4 **3 Claims**



1. A transom mount for mounting the motor tube of a fishing motor on the transom of a boat, comprising a clamp adapted for gripping the transom, a yoke swiveled on said clamp, means on said yoke for holding said motor tube, said yoke adapted for swinging said motor tube between vertical operating position and horizontal stowed position, spring-biased catch means on said yoke to engage said clamp when the yoke is in operating position, and spring-biased clip means on the clamp to engage the yoke in the stowed position, said clip means being L-shaped having two legs extending angularly from an apex rockingly abutting said clamp, one leg for lockingly engaging said yoke and the other leg adapted to be manually pressed to rock the clip means and release the yoke.

4,076,194

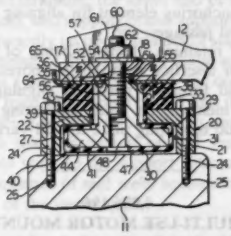
SNUBBED PAD RESILIENT MOUNT

Dennis D. Feucht, Morton, and Terry W. Ryan, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 7, 1976, Ser. No. 730,543

Int. Cl.² B62D *27/04*

U.S. Cl. 248—9 **4 Claims**



1. An apparatus for resiliently mounting an engine on a frame comprising:

a housing adapted to be secured to the frame, said housing defining an internal chamber and an opening to said chamber having a diameter less than said chamber;

means for securing said housing to the frame;

a resilient pad disposed between said housing and the engine and having a protrusion extending into said opening in said housing, said pad and said protrusion having a common axially extending bore extending therethrough into said housing, the engine being seated on said pad;

a snubber spool adapted to be secured to the engine, said snubber spool having a stem portion extending through said bore and being radially spaced out of contact with the walls of said bore, said spool having an enlarged flange

portion extending radially from said stem portion and being positioned within said chamber with a diameter of said flange portion being greater than the diameter of said bore and being less than the diameter of said chamber;

a resilient element separate from said resilient pad and being disposed about said flange in spaced relation to the walls of said chamber and to the frame; and

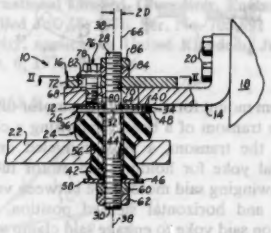
means for securing said snubber spool to the engine.

4,076,195

ADJUSTABLE MOUNTING ASSEMBLY

Douglas Lester Uhler, Painesville, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed May 20, 1977, Ser. No. 798,955
Int. Cl.² F16M 5/00; F16F 15/00
U.S. Cl. 248—9 **10 Claims**



1. An adjustable mounting assembly comprising:

a supporting member having a load bearing surface and an anchoring element;

a variably positioned member having an opening and a plurality of threaded passages, said opening having an axis and being of a size sufficient for freely fitting over said anchoring element, said threaded passages being spaced a substantially equidistance from said axis, and said variably positioned member being supported by said load bearing surface;

a mounting plate having an aperture and a plurality of bores, said bores defining a common geometric center, said aperture being eccentrically offset from said geometric center and of a construction sufficient for fitting closely over said anchoring element, said mounting plate being rotatable about said anchoring element for aligning said bores with said threaded passages; and

a plurality of retaining elements being of a construction sufficient for insertion through said bores, screw threading into said threaded passages, aligning said variably positioned member on said supporting member, and clamping said mounting plate to said variably positioned member.

4,076,196

MULTI-USE MOTOR MOUNT

Fred Levine, 1330 - 99th St., Bay Harbor Islands, Fla. 33154

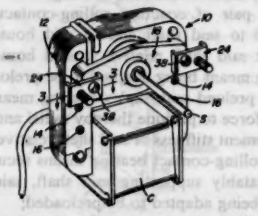
Filed Jun. 3, 1976, Ser. No. 692,271
Int. Cl.² F16F 15/08; H02K 5/24
U.S. Cl. 248—14 **7 Claims**

1. Apparatus for relocating mounting studs for replacement fan motors and the like, comprising in combination:

a. a bracket provided with an opening means;

b. a mounting stud including a first head and a screw threaded first shank, being arranged in the opening means and extending from the bracket for attaching the bracket to a supporting panel; and

c. bolt means including a bolt comprising a second head and a screw threaded second shank, with the second shank being also selectively arranged in the opening means and extending from the bracket for being disposed in a mounting hole of a motor being mounted, the bracket being a substantially U-shaped channel provided with a planar back portion having a first surface and a second surface parallel to the first surface, the opening means being a pair of apertures provided in the back portion, one each for the stud and bolt, and a pair of legs extending co-directionally



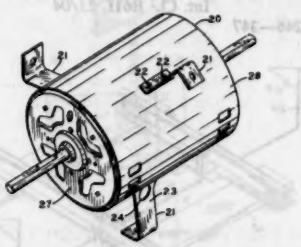
in spaced relation from the back portion and facing the first surface, the first head, that of the stud, abutting the first surface of the back portion and being disposed between the legs of the bracket, with the second head, that of the bolt, abutting the second surface.

4,076,197

TORSIONAL VIBRATION ISOLATING MOTOR MOUNTING ARRANGEMENT AND METHOD OF MAKING THE SAME

Richard W. Dochterman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Jun. 18, 1976, Ser. No. 697,547
Int. Cl.² F16F 15/04; F16M 11/04
U.S. Cl. 248—15 **11 Claims**



1. A torsional mode vibration isolating mounting arrangement for an alternating current induction motor designed for excitation by an alternating voltage of a predetermined source frequency, and wherein said motor has a polar moment of inertia I_p, measured in pound-inches-seconds^2, said mounting arrangement including a plurality of arms, formed from flat sheet material, extending radially from the motor and each having at least one tuning aperture formed therein with each aperture lying generally along a different generally radially extending plane; said tuning apertures being sized and located so that the cumulative effective spring constant, in pound-inches per radian will be less than the quantity $2.84 \times I_p \times 10^5$.

4,076,198

MOBILE HOME TELEPHONE STAKE

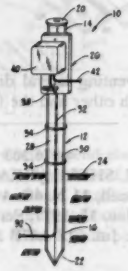
Deloris Garrett, 4331 N. McKinley, Oklahoma City, Okla. 73118

Filed May 24, 1976, Ser. No. 689,488
Int. Cl.² H02G 9/02
U.S. Cl. 248—49 **3 Claims**

1. A mobile home telephone stake used with an underground telephone cable, the end of the cable received in a junction box mounted on the stake, an additional telephone cable is attached to the junction box and received in the mobile home for providing telephone service thereto, the telephone stake comprising:

an elongated metal post having a first side portion and a second side portion, said side portions intersecting, forming a "V" shaped cross section, said side portions having outwardly extending edges, said post having an upper end portion, a center portion, and a lower end portion, said lower end portion having a pointed end for inserting said post in the ground surface;

a flat mounting plate, the back of said plate attached to the outwardly extending edges of said first and second side portions of said post, said plate disposed below the top of the upper end portion of said post, the sides of said plates extending outwardly from the first and second side portions of said post, said mounting plate including a plurality of sets of apertures in a spaced relationship thereon, each of said sets of apertures threadably receiving mounting fasteners of a particular make of junction box;



a flat washer attached to the top of the upper end portion of said post and extending outwardly therefrom, said washer used for striking the upper end portion of the telephone stake and driving the stake into the ground surface; and

flexible ties secured around the exterior of said first and second side portions of said post for holding the underground telephone cable against the interior sides of said first and second side portions of said post.

4,076,199

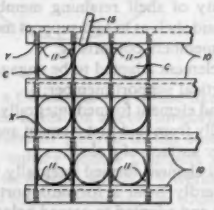
CABLE SUPPORT METHOD AND APPARATUS

George T. Paulsen, 13 B Mitchell St., Norwich, N.Y. 13815

Filed Jul. 6, 1976, Ser. No. 702,580

Int. Cl.² F16L *3/22*

U.S. Cl. 248—68 R 17 Claims



1. Clamping apparatus for clamping together a plurality of elongated articles extending generally parallel to each other, said articles being arranged in rows and columns, said apparatus comprising, in combination: a plurality of separate substantially rigid bar members extending parallel to and spaced apart from each other, with each of said rows of said articles being situated between adjacent pairs of said bar members; and a plurality of separate flexible straps inserted through and extending between said bar members, at least one of said bar members including a plurality of ratcheting locking means engaging respective cooperating locking means on said straps to maintain tension in said straps and maintain each row of said articles clampingly engaged by and between a respective pair of said bar members, said apparatus being unsupported except by said articles.

14. The method of binding a plurality of electrical cables in rows and columns which comprises the steps of: inserting an unsupported rigid bar on each side of each row of said cables with said bars extending substantially parallel to each other in a first direction; passing a plurality of separate straps through openings spaced along said bars in a second direction generally perpendicular to said first direction, said openings in at least the last of said bars through which said straps are passed having ratcheting locking means preventing removal of said straps therefrom; and tightening said straps to compress said cables between said bars.

4,076,200

SUPPORTED VESSEL AND MEANS FOR SUPPORT THEREOF

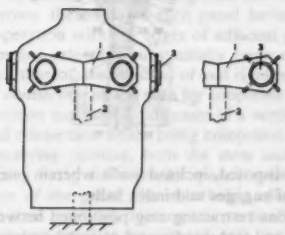
Harold Edward Haigh, Stockton on Tees, and Dietrich Adolf Hofmann, Newcastle on Tyne, both of England, assignors to Tioxide Group Limited, Billingham, England

Filed Sep. 28, 1976, Ser. No. 727,589

Claims priority, application United Kingdom, Nov. 6, 1975, 46093/75

Int. Cl.² B65D *25/24*

U.S. Cl. 248—146 8 Claims



1. A supported vessel comprising:

a. a vessel, the sides of which are provided with a number of outwardly directed projections, and

b. a support comprising a plurality of support points carried on a support structure, the lower end of which is secured in the ground, said support points supporting webs which project outwardly on opposite sides of said support points, said webs being of thickness and shape such that they are complant in a horizontal direction, the center part of each web being fixed to a support point and the outer ends of each web being adapted to be fixed to a projection on said vessel such that the weight of said vessel is projected through said webs to the support structure and the horizontal compliance of said webs accommodates horizontal movement of the vessel wall.

4,076,201

ADJUSTABLE CHAIR-SPINDLE ASSEMBLY

Walter E. Hudnall, 2157 W. 236th Place, Torrance, Calif. 90501

Filed Feb. 10, 1977, Ser. No. 767,375

Int. Cl.² F16M *11/00*

U.S. Cl. 248—162 7 Claims

1. An adjustable chair spindle apparatus to selectively position the height of a chair seat mounted to the chair-support structure, said apparatus comprising:

a central index spindle fixedly secured to said chair-support structure, wherein said central index spindle includes a plurality of annular grooves equally spaced apart along the longitudinal length thereof;

positioning selective means arranged to be slidably mounted on said index spindle in a releasable locking arrangement, said positioning selective means comprising a central,

tubular support strut arranged to be attached to said chair seat at one end thereof;

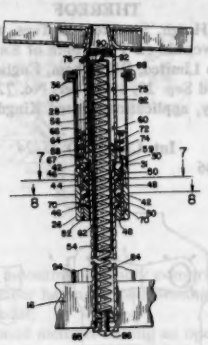
a lever-actuating means operably connected to said positioning selective means, to allow said selective means to be released from a locked condition with said index spindle;

pneumatic means within said positioning selective means to control the rate of vertical movement between said chair seat and said support structure; and wherein said releasable locking means comprises:

a thrust collar secured to said support strut having a plurality of apertures disposed therein;

at least one set of index balls arranged within said thrust collar so as to pass through said apertures to engage said index housing;

at least one index ring slidably positioned between said thrust collar and said spindle, said index ring having oppo-



sitely disposed, inclined walls wherein one inclined wall thereof engages said index balls;

at least one restraining ring positioned between said thrust collar and said spindle, said restraining ring being secured to said thrust collar and having an inclined wall adjacent said inclined wall of said index ring, thereby defining a raceway therebetween; and

at least one set of bearing balls disposed in said raceway for engagement within said annular grooves of said spindle to provide a vertical locking arrangement between said central, tubular support strut and said spindle to prevent vertical movement therebetween, and wherein said index housing includes at least one annular recess therein adjacent said thrust collar to receive said index balls therein when said index housing is raised to release said locking means.

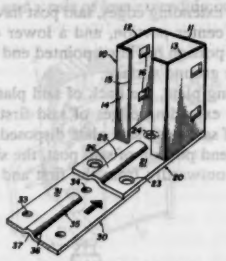
4,076,202

SHIM FOR RACK COLUMN

Kennedy McConnell, Homewood, Ill., assignor to Interlake, Inc., Oak Brook, Ill.

Filed Mar. 25, 1977, Ser. No. 781,173
Int. Cl.² F16M *11/24*
U.S. Cl. 248—188.2 **13 Claims**

1. A nestable shim to control the elevation of an associated column resting on a foot member which has a flat bottom surface with an elongated concave groove therein, said shim comprising a flat plate having an elongated ridge portion with a convex top surface and a concave bottom surface, said convex top surface being shaped and dimensioned to nest within the groove in the foot member when received therebeneath for cooperation therewith to prevent lateral displacement of said plate from the foot member, said top and bottom surfaces of said ridge portion being complementary to each other to permit stacking of a plurality of said plates with each said top surface being nested within the bottom surface of the immediately overlying one of said plates, whereby a plurality of said shims may be stacked beneath the foot member to elevate the



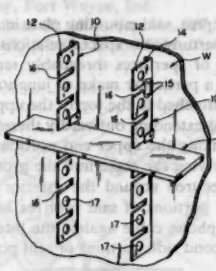
column while preventing lateral displacement of said shims with respect to each other and the foot member.

4,076,203

WALL SHELF ARRANGEMENT

Thomas M. McDonnell, 11 N. 4th Ave., Maywood, Ill. 60153

Filed Jun. 15, 1977, Ser. No. 806,745
Int. Cl.² A47B *57/16*
U.S. Cl. 248—247 **9 Claims**



1. In a wall shelf arrangement, the combination of:

(a) a pair of vertical support members attachable to a vertical surface such as a wall structure;

(b) said support members each having a plurality of forwardly facing, vertically spaced slots for removably receiving a plurality of horizontally disposed shelves;

(c) a plurality of shelf retaining members for detachably securing said shelves to said support members, each of said retaining members comprising:

(i) a first element adapted to be engaged behind a portion of a vertical support member;

(ii) a second element formed integrally with and extending forwardly from said first element and adapted to overlie an upper surface of a shelf;

(iii) a third element formed integrally with and projecting downwardly from a forward portion of said second element and adapted to extend below the upper surface of said shelf for engagement with said shelf to prevent the accidental forward movement of said shelf out of the related slot of the related support member.

4,076,204

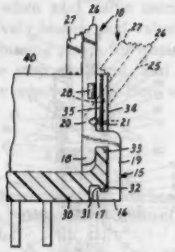
RETAINING CLIP

James C. Kalka, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 16, 1976, Ser. No. 742,176
Int. Cl.² H01R *13/54*
U.S. Cl. 248—500 **4 Claims**

1. A retaining clip for retaining two mating pieces together comprising an attaching end of generally C-shaped cross-sec-

tion having a first arm with a hook formed at its free end, a second arm terminating in a smooth arcuate curve and a central segment connecting said first and second arms together; a rectangular retaining end having a latching member affixed along one edge thereof at its free end, said latching member being adapted for holding one of said mating pieces by resting



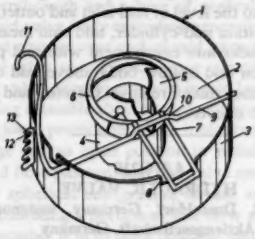
on a surface thereof, said retaining end also having a latching tab along each longitudinal edge thereof; an integral central hing along the intersection of said attaching end and said retaining end, said hinge permitting oscillating movement of said retaining end of said clip from a first position to a second position.

4,076,205

SUPPORT, INTENDED TO BE USED PRIMARILY AS A CHRISTMAS TREE STAND

Bengt Önnert Almér, Saltholmsgatan 55, and Karl Gunnar Gidlöf, Forsvarsgatan 1, both of Vastra Frolunda, Sweden (42176)

Filed Dec. 2, 1976, Ser. No. 747,011
Claims priority, application Sweden, Dec. 9, 1975, 7513841
Int. Cl.² A47G *33/12*
U.S. Cl. 248—524 **6 Claims**



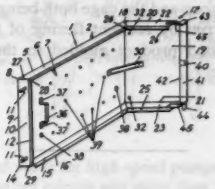
1. A support for a Christmas tree or the like comprising a base member adapted to rest on a level supporting surface, an open top cup-like element secured to the base member and rising therefrom, a unitary hollow clamping shell which is rounded at least on its portion which is lowermost during use and being formed of resilient material, the rounded portion of the clamping shell resting on the open top of the cup-like element and being swiveled on such open top for universal adjustment, the clamping shell having a top-to-bottom through opening adapted to receive a Christmas tree trunk or the like, the clamping shell being circumferentially slotted to form plural circumferentially spaced clamping jaws whose top edges in the use position of the clamping shell are adapted to be forced into clamping engagement with a Christmas tree trunk or the like, and a lockable adjustable operating means for the clamping shell on said base member including a camming element having camming engagement with said jaws, movement of the camming element in a downward direction forcing the lower rounded portion of the clamping shell downwardly in the cup-like element to thereby force said clamping jaws into clamping engagement with a Christmas tree trunk or the like being supported.

4,076,206

PANEL FORMS HAVING PANEL REINFORCING MEANS

Jorge Marseillan, Sarmiento 440, Buenos Aires, Argentina

Filed Apr. 13, 1976, Ser. No. 676,613
Claims priority, application Argentina, Apr. 17, 1975, 258414
Int. Cl.² E04G *11/08, 17/08*
U.S. Cl. 249—44 **12 Claims**



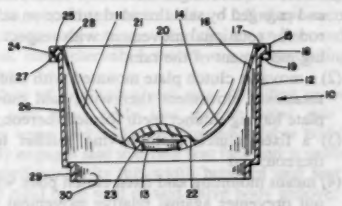
1. A form for walls and the like, formed by two parallel, facing molding surfaces delimiting the outer surfaces of the wall to be molded, wherein each of said two surfaces is formed by a plurality of panels arranged to define mutually facing columns and rows, the edges of each panel having support means for cooperation with the edges of adjacent panels and having rigid means extending substantially transverse to the molding surface thereof; the free end of said rigid means comprising spaced connection means each for cooperation with the adjacent connection means of rigid means of a vertically adjacent panel, said connection means being comprised by a stem, and a stem receiving opening, both the stem and the stem receiving opening being substantially spaced apart from the molding surface of the panel; the stem being adapted to be received in the stem receiving opening of a vertically adjacent panel to permit one panel to be pivoted with regard to the panel vertically adjacent and below thereto; mutual locking means on the vertical edges of adjacent panels, at least the end panels of each column of panels formed with opposed openings, means extending through said opposed openings mutually to connect facing panels, said panels and said last mentioned means having cooperating locking means, whereby the panels forming the facing molding surfaces constitute a self-supporting assembly.

4,076,207

FOOD MOLD

Forrest L. Austin, Brooklyn Center, Minn., assignor to The Cornelius Company, Minneapolis, Minn.

Filed May 19, 1975, Ser. No. 578,526
Int. Cl.² A23P *1/00*
U.S. Cl. 249—66 R **5 Claims**



1. A mold liner for molding food to a predetermined shape comprising:

(a) a cup having a flexible bottom and side formed of elastomeric film, an open end, and a sanitary inner concave

surface forming a predetermined normal cup shape for receiving food product therein;

(b) a rim attached to and circumferentially about the open end of the cup;

(c) securement means on the rim for securing the cup to a rigid holder;

(d) a resiliently and flexibly deformable weight retaining cage formed by an undercut cavity in the bottom and open to the bottom side of the liner, said cage receiving and retaining a weight in the bottom of the liner and being flexibly and resiliently deformable for insertion thereinto and removal therefrom of the weight;

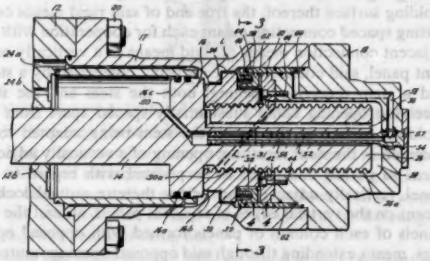
the bottom of the cup and the cage both being resiliently movable toward the rim by resilient flexing of the cup side for discharge of a food product molded to the predetermined normal cup shape.

4,076,208

BLOWOUT PREVENTER RAM LOCK

Richard A. Olson, Houston, Tex., assignor to Hydril Company

Filed Oct. 4, 1976, Ser. No. 729,269
Int. Cl.² E21B *33/06*
U.S. Cl. 251—1 A **40 Claims**



1. In a blowout preventer having at least one blowout preventer ram movable therein to adjustable closed positions for sealing contact with a well pipe or the like in a bore of the blowout preventer, a ram lock for locking the ram at the adjustable closed positions, comprising:

(a) ram carrier means comprising a ram piston having a piston rod with a threaded surface formed thereon for moving the ram to the adjustable closed positions in the blowout preventer;

(b) lock means for locking said ram carrier means at adjustable closed positions, comprising:

(1) a lock nut having a threaded surface formed thereon and engaged by said threaded surface on said ram piston rod for rotational movement with respect thereto during movement of the ram;

(2) a movable clutch plate mounted with said lock nut for rotational movement therewith, said movable clutch plate having ratchet teeth formed thereon;

(3) a fixed clutch plate having ratchet teeth formed thereon; and

(4) means mounting said fixed clutch plate with the blowout preventer against relative movement with respect thereto; and

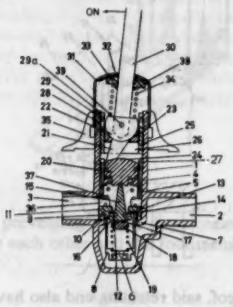
(c) means for moving said ratchet teeth of said fixed clutch plate and said movable clutch plate into engagement to lock said ram carrier means against outward movement as the ram is moving inwardly.

4,076,209

IMPROVED TAP

Thomas A. Kilgariff, Glenunga, Australia, assignor to Kilgariff Holdings Pty. Ltd., Australia

Filed Mar. 25, 1976, Ser. No. 670,565
Int. Cl.² F16K *31/524*
U.S. Cl. 251—251 **9 Claims**



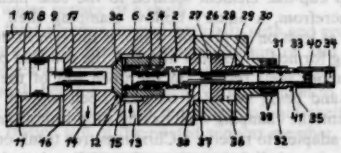
1. A fluid control valve comprising a cylindrical hollow body having an inlet, and an outlet, a cylinder screwed directly into the hollow body and having a bottom defining an aperture surrounded by a valve seat, a valve member closing the aperture by engagement on the seat, said valve member having a stem extending through the aperture, a piston slidable in said cylinder and engaging the stem, spring means acting between the cylinder bottom and the piston, further spring means acting to close the valve member, and cam means for actuating the piston to open the valve, whereby the closure of the valve is by said spring means assisted by fluid pressure and manual effort is applied only to open the valve, said inlet and outlet in the cylindrical body being disposed laterally, said cylindrical body including an upstanding portion extending upwardly beyond said inlet and outlet, said cylinder extending within said upstanding portion to the level of said inlet and outlet, said piston being confined within said cylinder, said cam means penetrating into said cylinder into engagement with said piston and a sleeve mounted on said hollow body above said cylinder for axial adjustable movement relative thereto, said cam being supported by said sleeve.

4,076,210

HYDRAULIC VALVE

Harry Spielvogel, Dusseldorf, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Germany

Filed Feb. 27, 1975, Ser. No. 553,735
Claims priority, application Germany, Mar. 2, 1974, 2410077
Int. Cl.² F16K *51/00*
U.S. Cl. 251—285 **2 Claims**



1. A hydraulic valve comprising: housing means;

a valve member axially movable within said housing means;

a cylinder formed in said housing means;

a first hydraulically actuated stepped piston slidable in said cylinder, said piston having a shank with a threaded bore, said shank further including an outer threaded portion which extends out of said cylinder;

lock nuts, engageable with said outer threaded portion of

said shank, for adjusting the travel of said first piston in said cylinder;

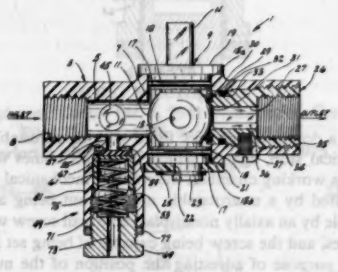
a threaded piston rod, threadably received into said threaded bore of said first piston shank, forming a stop abutment for limiting axial movement of said valve member, said threaded rod axially adjustable in said first piston; and

means for positively biasing said valve member against said stop abutment when said valve member is open, said means for positively biasing said valve member comprising a hydraulic biasing piston for biasing the valve member towards the stop abutment, and spring means for biasing the valve member away from said stop abutment.

4,076,211
BALL VALVE

Joseph L. Krechel, Chesterfield, and Michael J. Purvis, Maplewood, both of Mo., assignors to Control Devices, Incorporated, St. Louis, Mo.

Filed Oct. 14, 1975, Ser. No. 621,956
Int. Cl.² F16K 5/06
U.S. Cl. 251—286 **6 Claims**

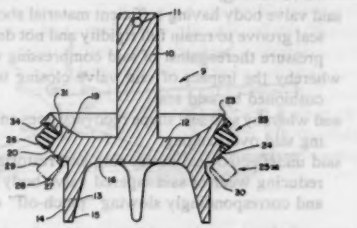


1. A valve comprising a valve body having a main flow passage therethrough and a bore of generally circular cross-section in said valve body extending generally perpendicularly through said passage, one end of said passage constituting an inlet and the other end of said passage constituting an outlet, a unitary ball valve member received in said bore, said ball valve member being rotatable about the longitudinal axis of said bore between a closed position in which it blocks flow through said flow passage and an open position in which it permits flow through said flow passage, said ball valve member comprising a generally spherical ball portion having an aperture therethrough constituting a portion of said flow passage when said ball valve member is in its open position, and a pair of circular sealing heads, one on each side of said ball portion, each of said sealing heads carrying a seal which slidably, sealingly engages the walls of said bore so as to seal said ball valve member relative to said valve body and to permit rotational and axial movement of said ball valve member within said bore, said sealing heads being of substantially the same diameter so that pressure forces acting on said ball valve member which tend to move the latter axially within said bore are balanced, means external to said valve body at each end of said ball valve member for retaining said ball valve member in said bore and for permitting limited axial movement of said ball valve member in said bore by engagement with said valve body, and seal means insertable in said flow passage from one end thereof, said seal means comprising a body having a longitudinal bore therethrough constituting a portion of said flow passage, and an end seal carried on the inner end of said seal body engageable with said ball portion, said retaining means permitting limited axial movement of said ball valve member in said bore to a position in which said end seal is sealingly seated on said spherical ball portion for preventing leakage around said ball portion to said outlet when said ball valve member is in its closed position.

4,076,212
STRETCH SEAL VALVE

Arthur L. Leman, 10340 Wallisville Road, Houston, Tex. 77029

Filed Mar. 10, 1977, Ser. No. 776,120
Int. Cl.² F16K 1/38, 15/02
U.S. Cl. 251—332 **8 Claims**



1. An improved valve for high speed pumps operating as fast as 200 revolutions per minute and more than three valve openings and closings per second, and subject to fluid pressure of as much as about 5,500 pounds per square inch, comprising

an annular metal valve seat ring having an upwardly inwardly facing conically tapered flat seat face;

a rigid, integral, annular, metal valve body mounted for reciprocation relative to and coaxially with said seat ring,

said valve body having a downwardly outwardly facing, conically tapered flat seating face,

said valve body seating face having the identical taper of and overlying the inner portion of said seat ring seat face;

said valve body recessed outwardly of its said seating face to present thereat an annular seal groove,

said seal groove having a rigid flat back wall of the same taper as said seat and seating faces, an at least partial outer side wall, and a flat inner side wall inclined substantially at right angles to said back wall;

an annular, rubberous, rectangular-section seal ring in said seal groove,

said seal ring dished to have front and back faces paralleling said seat and seating face taper, and parallel inside and outside faces inclined as said inner side wall of said groove,

said seal ring having when relaxed an inside diameter critically less than the inside diameter of said groove, and whereby said ring is calculatedly pre-stressed in circumferential tension when seated in said groove,

the depth of said seal ring exceeding the depth of said seal groove, and the front face of said seal ring overhanging said seating face of said valve body, such that compressing of said seal ring upon full closing of said valve cushions said valve closing and minimizes the wear on said tapered seat and seating faces,

said seal ring pre-stressing in tension being sufficient both

to stiffen said ring against flow under and "pinch-off" by said fluid pressure and

to so accelerate the rate of elastic recovery of said seal ring beyond its relaxed rate as to achieve full shape recovery from seating compression within the about $\frac{1}{4}$ seconds, or even less, time intervals between successive closings of said valve,

said seat face of said valve seat ring extending upwardly beyond said valve body seal groove outer side wall whereby upon said valve closings said valve body seal ring fully engages said seat ring seat face and is uniformly compressed across its full width between said seat face and said rigid back wall of said valve body groove,

the confining of said seal ring by said valve body groove back and inner side walls allowing only upward-outward expansion of said seal ring upon said valve closing,

said groove outer side wall spaced apart from said groove inner side wall a distance sufficiently greater than the width of said ring to accommodate the upward-outward

seal ring flow towards said outer side wall resulting from compression of the seal, upon said full valve closing to engage said seat and seating faces, that is uniformly over the entire cross-section of the seal,

said outward seal flow being of the entire same seal amount as the overhang amount that is displaced upon the said full valve closing,

said valve body having sufficient material about said annular seal groove to retain full rigidity and not deflect under the pressure thereagainst of said compressing of said seal,

whereby the impact of said valve closing is absorbed and cushioned by said seal,

and whereby said seal shape recovery goes entirely to restoring said overhanging,

said undeflected seal cushioning and restoring substantially reducing wear of said tapered valve body and seat faces, and correspondingly slowing "pinch-off" of said seal.

4,076,213

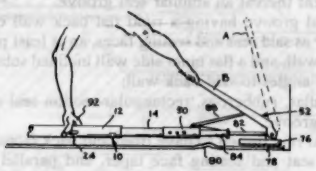
LOCKING TUBE ASSEMBLY

Buford L. Payson, Sun City, Ariz., assignor to Robert A. Strauss, Long Beach, Calif., a part interest

Filed Mar. 4, 1977, Ser. No. 774,254

Int. Cl.[2] A47G *27/04*

U.S. Cl. 254—60 **7 Claims**



1. An extendible locking tube assembly for attachment to a carpet stretcher comprising:

an outer tube bearing first and second longitudinal slots on opposite sides, intermediate its length;

a locking collar member received within said outer tube having a central aperture on an axis obliquely inclined to the face of said collar member;

a locking member slidably received within said central aperture;

a radial lug projecting from said collar member and extending through said first slot;

abutment means carried on said outer tube forward of said first slot and bearing against the forward face of said radial lug to provide a fulcrum for said collar member;

lever means carried by said collar and projecting through said second slot;

retainer means fixedly carried within said outer tube;

resilient means captured between the rear face of said collar member and said retainer means;

an inner tube slidably received within said outer tube and removably attached to the rear end of said locking member; and

attachment means distally carried by said assembly for attachment in a carpet stretcher assembly with said first and second longitudinal slots in a horizontal plane whereby said abutment means and radial lug can be grasped to release said locking means and retract said assembly with a single-handed motion.

4,076,214

DOUBLE-ACTING JACK HAVING A POSITION STOP

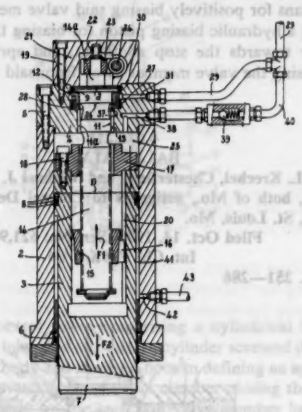
Pierre Colly, 38, chemin du Grand Bois, Tassin la Demi Lune, Rhone, France

Filed Dec. 20, 1976, Ser. No. 752,549

Claims priority, application France, Dec. 24, 1975, 75 40385

Int. Cl.[2] F15B *9/09*

U.S. Cl. 254—93 R **3 Claims**



1. In a double-acting jack fitted with an adjustable positive mechanical stop, against which its piston comes to rest and having a working chamber, the positive mechanical stop being constituted by a nonrotatable nut, the nut being axially displaceable by an axially nondisplaceable lead screw with which it meshes, and the screw being capable of being set in rotation for the purpose of adjusting the position of the nut, the improvement wherein said positive mechanical stop which limits the stroke of said piston includes means for controlling the supply of pressurized fluid from a supply line to said working chamber of the jack by opening the supply line to said working chamber when the fluid is pressurized and said piston and said rod are not at a given end-of-stroke position and by closing the supply line to said chamber as soon as said piston and said rod reach the end-of-stroke position.

4,076,215

ELECTROHYDRAULIC DRAWING APPARATUS, PARTICULARLY A HOIST

Heinrich Landert; Wolfgang Radau, both of Bulach, and Ernst Kuhn, Embrach, all of Switzerland, assignors to Landert - Motoren A.G., Bulach, Switzerland

Filed Dec. 7, 1976, Ser. No. 748,387

Claims priority, application Switzerland, Dec. 15, 1975, 16225/75

Int. Cl.[2] B66F *3/24*

U.S. Cl. 254—93 R **10 Claims**

1. An electrohydraulic drawing apparatus, particularly a hoist for pulling or lifting and lowering loads comprising: a cylinder piston unit; a hydraulic fluid tank; a pump coupled to an electric motor and connected to said cylinder piston unit; control means for electrical and hydraulic control of the drawing apparatus; a load lifting member; control handle means connected to said control means, said control handle means having displacement directions coinciding substantially with motion of said load lifting member; said piston unit has a speed continuously variable in two directions as a function of the

displacement of said control handle means; and said hydraulic fluid tank, said electric motor, a pump, said control means and

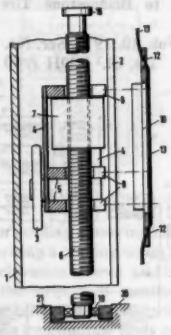
said load lifting member comprising one compact unit rigidly connected to one end of said cylinder piston unit.

4,076,216

HOIST MECHANISM

Hans Nussbaum, Korker Str. 6, 7641 Bodersweier, Germany

Filed Dec. 14, 1976, Ser. No. 750,418
Claims priority, application Germany, Dec. 16, 1975, 2556691
Int. Cl.[2] B66F *3/08*
U.S. Cl. 254—98 22 Claims



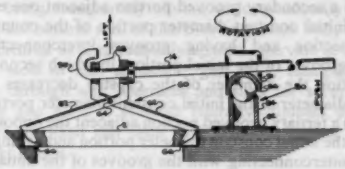
1. A hoist mechanism for lifting a load comprising:
an elongate hollow post having a longitudinally extending opening through the side thereof;
a threaded spindle rotatably mounted within said post and being generally aligned longitudinally with the opening of said post;
a traveling nut carried by said spindle for linear movement therealong in response to rotation of said spindle, the opening in said post having a width at least as great as the diameter of said traveling nut;
a movable carriage within said post engaged by said traveling nut to move therewith along a predetermined path defined by said spindle, said carriage having an opening generally aligned with the opening of said post and with said spindle, the opening of said carriage having a width of at least as great as the diameter of said traveling nut, whereby said spindle and said traveling nut may be removed laterally through said openings from an operative position within said post; and
power means carried by said post for rotating said spindle.

4,076,217

APPARATUS FOR LIFTING A MANHOLE COVER

George S. Haller, 359 Colt Drive, and Theodore C. Uphoff, 1298 Richard Road, both of North Huntingdon, Pa. 15642

Division of Ser. No. 561,863, March 25, 1975, Pat. No. 3,957,247. This application May 14, 1976, Ser. No. 686,417
Int. Cl.[2] B66F *11/00*
U.S. Cl. 254—131 9 Claims



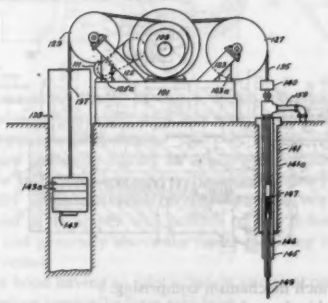
1. An apparatus for raising and lowering a manhole cover, said apparatus comprising:
a) a scissor type lifting means for engaging the edges of said manhole cover;
b) a lever which cooperates with said scissor type lifting means for raising and lowering said manhole cover in a vertical direction; and
c) a combination fulcrum and pivoting means engageable with said lever to raise said manhole cover and to pivot said manhole cover, in a plane parallel to the surface of the ground, when said manhole cover is in a raised position.

4,076,218

LONGSTROKE PUMPING APPARATUS FOR OIL WELLS

Robert H. Gault, Midland, Tex., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Sep. 24, 1976, Ser. No. 726,389
Int. Cl.[2] B66C *23/72*
U.S. Cl. 254—178 19 Claims



1. Improved longstroke pumping apparatus for oil well pumping comprised of:
(i) a reversible prime mover means,
(ii) rotatable grooved capstan means arranged to be periodically driven by said prime mover means during a pumping cycle,
(iii) a flexible linear force transmitting means for operatively connecting said rotatable grooved capstan means to a pumping string and to a counterweight which at least partially counterbalances the weight of the pumping string,
(iv) said rotatable grooved capstan means having a first or well cable section from which the flexible force transmitting means connecting to the pumping string extends and a second or counterweight section from which the flexible

force transmitting means connecting to the counterweight extends,

the improvement wherein:

(a) the grooved capstan has a surface contour comprising

(1) a substantially constant diameter portion constituting a substantial portion of the first or well cable section;

(2) an initial substantially constant diameter grooved portion constituting a substantial portion of the second or counterweight section,

(3) a secondary grooved portion adjacent one end of the initial constant diameter portion of the counterweight section and having grooves interconnecting with grooves of the initial portion, in which secondary portion the diameter of the capstan decreases from the diameter of the initial constant diameter portion,

(4) a tertiary grooved portion adjacent the opposite end of the initial constant diameter portion and having grooves interconnecting with the grooves of the initial portion, in which tertiary portion the diameter of the capstan increases from the diameter of the initial portion,

(b) means to activate the prime mover means as the flexible force transmitting means connecting the capstan to the counterbalance passes from the secondary to the initial portion and from the tertiary to the initial portion of the second section of the capstan, and

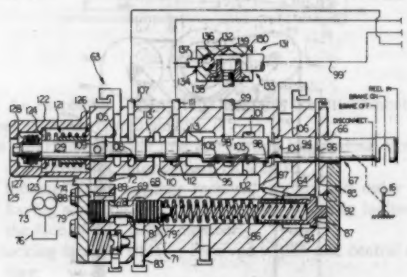
(c) means to deactivate the prime mover means as the flexible force transmitting means connecting the capstan to the counterbalance passes from the initial portion to the secondary portion and from the initial portion to the tertiary portion of the secondary section of the capstan.

4,076,219

FLUID PRESSURE-CONTROLLED WINCH MECHANISM

Bertwin E. Behrends, East Peoria; Richard F. Hoehn, Pekin, and James M. Poirot, Morton, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 13, 1976, Ser. No. 722,991
Int. Cl.[2] B66D *1/00*
U.S. Cl. 254—187.4 5 Claims



1. A winch mechanism comprising:

a rotatable drum for receiving and releasing a cable,

drive means for supporting said drum and for selectively transmitting rotary drive thereto, said drive means having a normally disengaged input clutch which is engageable in response to fluid pressure and further having a normally engaged brake for stopping rotation of said drive mean and said drum and which releases in response to fluid pressure,

a source of pressurized fluid,

a first flow line for transmitting pressurized fluid to said input clutch and a second flow line for transmitting pressurized fluid to said brake,

a control valve connected between said source of pressurized fluid and said first and second flow lines and having first outlet means communicated with said first flow line and second spaced-apart outlet means separately communicated with said second flow line, and having a valve position selector element movable to a Brake-On position at which both of said outlet means are isolated from said source of pressurized fluid and communicated with fluid drain means, said selector element also being movable to a Reel-In position at which pressurized fluid from said source is transmitted to both of said first and second outlet means, and

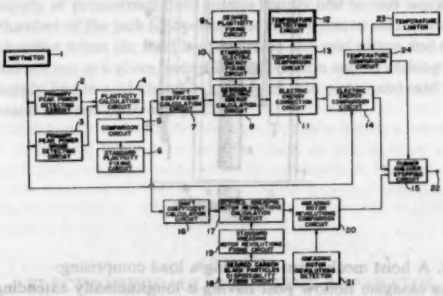
a unidirectional flow valve connected between said first and second flow lines and having means for enabling fluid flow therebetween from said first flow line to said second flow line but which blocks fluid flow from said second flow line to said first flow line, said unidirectional flow valve providing for a drain of fluid from said first flow line, as well as, said second flow line if the pressure in said first flow line exceeds that in said second flow line following movement of said position selector element away from said reel-in position.

4,076,220

METHOD OF MIXING AND KNEADING CONTROL OF A RUBBER KNEADER

Katsutoshi Nakashima; Toshio Kita; Ryuzo Osawa, all of Kodaira, and Takashi Hatanaka, Higashimurayama, all of Japan, assignors to Bridgestone Tire Company Limited, Kyobashi, Japan

Filed Feb. 10, 1976, Ser. No. 656,971
Int. Cl.[2] B29H *3/00*
U.S. Cl. 366—69 2 Claims



1. A method of mixing and kneading control of a rubber kneader, comprising the steps of:

placing rubber raw material and additives into a receptacle for working by said rubber kneader through electric motor means;

detecting the plasticity of said rubber raw material as a peak electric power;

comparing said detected peak electric power by a comparison circuit with a predetermined standard peak electric power; seeking deviation between said two peak electric powers for calculation of a shift coefficient; and

controlling total electric energy in relation to said shift coefficient to be spent by said electric motor means of said rubber kneader and total revolutions of said shift coefficient of a mixing and kneading rotor of said rubber kneader corresponding to the detected plasticity of said rubber raw material.

4,076,221

USE OF AN ACID-RESISTING CEMENT FOR THE PROTECTION AGAINST CORROSION OF STEEL SURFACES EXPOSED TO HOT GASES

Rolf Gröger, Oberhausen, Germany, assignor to August Thyssen-Hutte AG, Duisburg-Hamborn, Germany

Filed Nov. 4, 1976, Ser. No. 738,987
Claims priority, application Germany, Nov. 5, 1975, 2549506
Int. Cl.[2] C21B 9/06
U.S. Cl. 266—44 9 Claims

1. In a process for preheating a reduction gas or air employed in producing or refining of iron or steel wherein said reduction gas or air is passed through a preheater and from said preheater through a pipe to a producing or refining furnace for producing or refining said iron or steel the improvement wherein said preheater and said pipe comprise steel shells lined with an acid resisting cement for protecting the steel from corrosion, said acid resisting cement having on its inner surface averted from said steel shell a refractory lining, said cement comprising:

a) quartz sand and refractory material in the form of hollow spheres, said spheres being 10 - 40 vol.% of the total volume of the quartz sand and spheres,

b) silicate binder for the cement

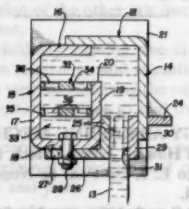
c) hardener.

4,076,222

RUNOUT COOLING METHOD AND APPARATUS FOR METAL ROLLING MILLS

Edward J. Schaming, P.O. Box 1070, Butler, Pa. 16001

Filed Jul. 19, 1976, Ser. No. 706,516
Int. Cl.[2] C21D 1/62
U.S. Cl. 266—111 3 Claims



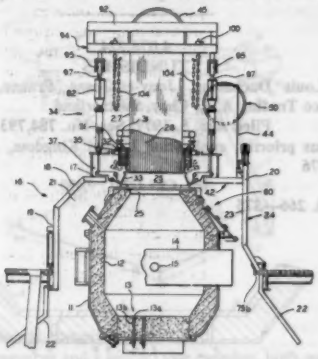
1. An apparatus for cooling a moving metal strip in a rolling mill or the like comprising a cooling water manifold adapted to be mounted at an elevation above said strip for delivering falling water onto the strip, said manifold extending transversely of the strip, said manifold comprising a first approximately L-cross section longitudinal body portion and a mating generally U-cross section longitudinal body portion, said L-cross section body portion having a top wall, a top wall extension on said U-cross section body portion in superposed relationship to said top wall of the L-cross section body portion and fixedly secured thereto, said U-cross section body portion having an interior wall substantially perpendicular to said top walls and having an upper edge spaced substantially below said top walls, said interior wall being disposed near the lateral center of said manifold and being in spaced parallel relationship to the side walls of the L-cross section body portion and U-cross section body portion, there being a main diffuser chamber in said manifold defined by the side and bottom walls of said U-cross section body portion, a diffuser assembly removably mounted in said diffuser chamber and including a pair of vertically spaced parallel apertured diffuser plates, the uppermost diffuser plate disposed substantially flush with said upper edge of said interior wall, a fixed vertical gap plate secured to the interior face of the side wall of said L-cross section body portion and extending below the lower edge of such side wall and below the bottom wall of the U-cross section body portion, said fixed gap plate being substantially coextensive longitudinally with said L-cross section and U-cross section body portions, an adjustable L-cross section gap plate having a vertical wall in spaced parallel opposing relation to the fixed gap plate and defining therewith a variable width vertical water curtain discharge slot extending for substantially the entire length of said manifold and for the full width of said metal strip, the vertical wall of said adjustable gap plate disposed between the fixed gap plate and said interior wall, the adjustable L-cross section gap plate having a bottom wall underlying the bottom wall of the U-cross section body portion and being transversely slotted at longitudinally spaced intervals, the bottom wall of the U-cross section body portion being apertured at longitudinally spaced intervals in registry with the slots of said adjustable gap plate, clamping bolts engaging through said apertures and slots for securing the adjustable gap plate is selected laterally adjusted positions relative to the fixed gap plate, said manifold having cooling water inlet means.

4,076,223

ENCLOSURE FOR STEEL CONVERTING APPARATUS

Eberhard G. Schempp, Pittsburgh, Pa., assignor to Pennsylvania Engineering Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1975, Ser. No. 645,536
Int. Cl.[2] C21B 7/22
U.S. Cl. 266—158 9 Claims



1. A converter vessel having a metal receiving opening formed adjacent an upper end and means for delivering an oxidizing gas to said vessel,

a primary enclosure having an upper wall portion disposed above said vessel and side wall portions extending downwardly along the sides of said vessel, a vent opening formed in the upper wall portion of said primary enclosure and generally above the metal receiving opening of said vessel,

a smoke hood having an inlet adjacent said vent opening and extending upwardly from said inlet,

a movable skirt disposed in surrounding relation to said hood inlet and movable into and out of close proximity with said metal receiving opening,

an auxiliary enclosure surrounding said vent opening and including a first portion having a first generally outwardly directed wall means having an inner edge disposed in closely surrounding relation to said hood and a second wall means extending generally vertically and spaced from said hood,

said auxiliary enclosure also including a second portion having a third wall means extending generally outwardly from said first portion and a fourth wall means extending generally vertically and spaced from said second wall means, the lower end of said fourth wall means engaging said primary enclosure in surrounding relation to said vent opening,

means extending through said auxiliary enclosure for mov-

ing said skirt vertically within said enclosure and relative to said metal receiving opening,

the second wall portion extending in general parallelism with that portion of said hood adjacent said inlet and being spaced therefrom to define an annular gap therebetween, said skirt being movable into and out of said gap upon vertical movement relative to said metal receiving opening,

said first auxiliary enclosure portion being attached to said hood, said second auxiliary enclosure portion being detached from said first portion and being disposed in closely surrounding relation thereto, engaging means associated with said skirt for engaging said second auxiliary enclosure portion when said skirt is elevated for elevating said second portion away from said primary enclosure,

translating means supporting said hood for movement laterally of said enclosure, supporting means on said translating means for releasably engaging said skirt when the latter is elevated for supporting said skirt and the second portion of said auxiliary enclosure,

said elevating means being releasably connected to said skirt and fixedly mounted relative to said translating means whereby said elevating means may be disconnected from said skirt and supported by said supporting means for lateral movement along with said translating means.

4,076,224

TUNDISHES

Jean Louis Duchateau, Jouy-en-Josas, France, assignor to Foseco Trading A.G., Chur, Switzerland

Filed Apr. 5, 1977, Ser. No. 784,793

Claims priority, application United Kingdom, Apr. 7, 1976, 14195/76

Int. Cl.² C21C 7/00

U.S. Cl. 266—275 **6 Claims**

1. In a tundish comprising an outer metal casing, a permanent refractory lining adjacent the casing, and an inner expendable lining made up of a set of slabs of heat insulating material, the impact area of the tundish being protected by a material selected from the class consisting of highly erosion resistant materials and sacrificial materials, the improvement which comprises providing a body of refractory highly heat-conductive material set in a recess in the permanent lining in the base of the tundish, and located below the material protecting the impact area to conduct heat away therefrom.

4,076,225

ADJUSTABLE ENERGY ABSORBING DEVICE PROVIDING LINEAR DECELERATION

Benjamin T. Houghton, Batavia, N.Y., assignor to Enidine Incorporated, Buffalo, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,730

Int. Cl.² F16F 9/48

U.S. Cl. 267—34 **19 Claims**

1. An adjustable kinetic energy absorbing device comprising:

a) a housing;

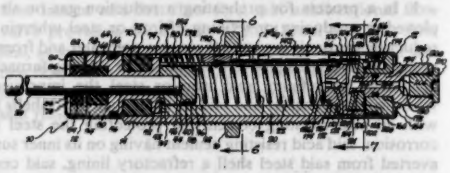
b) means in said housing including a hollow elongated element defining a chamber for containing hydraulic fluid;

c) piston means having a portion movable along within said hollow element and a portion for receiving external forces;

d) a plurality of orifice openings in said hollow element spaced therealong in the direction of movement of said piston means;

e) means defining an elongated path outwardly of said chamber and in fluid communication with said orifice openings, said path being relatively narrow in width and extending along said hollow element;

f) means defining a region in said housing in fluid communication with said path for receiving fluid flowing through said orifice openings and along said path; and



g) flow control means including an elongated element adjustably supported in said housing and movable lengthwise along said path in operative relationship with said orifice openings to adjust the effective size of said openings, said flow control element having surface formations spaced axially therealong and adapted to register with said orifice openings, each of said formations varying in size axially along said element, whereby movement of said flow control element along said path varies the degree of registry between corresponding formations and orifice openings to adjust the effective size of said openings.

4,076,226

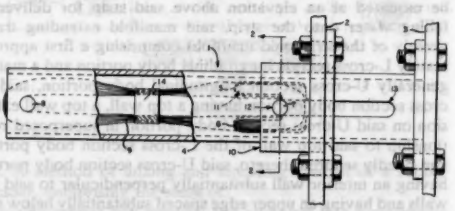
ENERGY ABSORBING MECHANISM

Colin Anolick, and Howard James Kutsch, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 2, 1976, Ser. No. 719,952

Int. Cl.² F16F 1/36, 3/08

U.S. Cl. 267—139 **8 Claims**



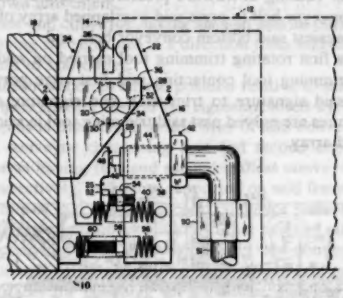
1. An energy absorbing mechanism comprising, in combination, a support member, an elongated member carried by said support member and having one end disposed to receive an impact wherein the opposite end is free for displacement under said impact, said elongated member being provided with two longitudinally spaced transverse pins and a pair of longitudinal slots within which the pin adjacent said outboard end of the elongated member is free to slide, said pin adjacent said outboard end of the elongated member being fixed to said support whereas said other transverse pin is fixed to the inboard end of said elongated member, an oriented elastomer operably connecting said pins so as to constitute an energy absorber upon displacement of said elongated member responsive to impact causing relative separation of said pins.

4,076,227

SELF-ALIGNING WORK HOLDING CLAMP

William W. Rameson, Santa Monica, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 10, 1976, Ser. No. 684,992
Int. Cl.[2] B25B 1/18
U.S. Cl. 269—25 4 Claims



1. A self-aligning work holding clamp for clamping to a work support a work part resting on the support and having a gripping element for clamping engagement by the clamp, comprising:

a mounting base to be fixed to said work support;

a pair of clamp members having opposed gripping jaws for straddling said gripping element of said work part;

means pivotally mounting said clamp members on a common pivot axis on said mounting base for initial rotation of either jaw into contact with said gripping element and following rotation of the other jaw into contact with said gripping element;

first means for yieldably biassing one clamp member to a normal position relative to said mounting base;

second means for yieldably biassing the other clamp member to a normal position relative to said one clamp member; and

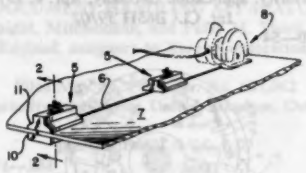
actuating means carried by and acting between said clamp members for relatively rotating said clamp members to open and close said jaws.

4,076,228

KERF CLAMP

Harold S. Sheldon, Spokane, Wash., assignor to Adjustable Clamp Company, Chicago, Ill.

Filed May 27, 1976, Ser. No. 690,649
Int. Cl.[2] B25B 5/14
U.S. Cl. 269—49 1 Claim



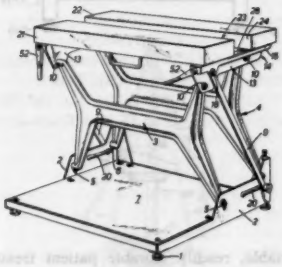
1. A kerf clamp comprising, in combination, a clamp base part having an upper horizontal planar work piece engaging surface, a vertical kerf blade permanently rigidly mounted on said clamp base part so as to project perpendicularly upwardly therefrom and through a kerf in a work piece, a screw mounted vertically on the upper distal end of said blade, a clamp tightening nut threaded onto said screw, and a clamp pressure part having a lower horizontal planar work piece engaging surface and having a vertical slot opening therein for recieving said kerf blade extending upwardly from said lower horizontal planar work piece engaging surface and an additional opening for receiving said screw extending downwardly from the top surface of said clamp pressure part, said kerf blade and said vertical slot providing means to align said clamp base and pressure parts with each other and with a kerf, and the mounted end of said screw being slotted and straddling the distal end of said blade and pivotably pinned thereto.

4,076,229

WORKBENCHES

Donald Price Hickman, Waltham Abbey, England, assignor to Inventec International Limited, Point Robert, Guernsey (Channel Is.)

Continuation of Ser. No. 495,265, Aug. 7, 1974, abandoned, which is a division of Ser. No. 177,123, Sept. 1, 1971, Pat. No. 3,841,619, which is a division of Ser. No. 803,600, March 3, 1969, Pat. No. 3,615,087. This application Dec. 22, 1975, Ser. No. 642,743
Claims priority, application United Kingdom, Mar. 4, 1968, 10484/68
The portion of the term of this patent subsequent to Oct. 26, 1988, has been disclaimed.
Int. Cl.[2] B25B 1/10
U.S. Cl. 269—139 68 Claims



1. A workbench comprising:

a first vise member and a second vise member, both members having opposed vertical clamping faces and lying in side by side relationship to provide a clamping space which is open topped and open ended, each of said vise members having a flat upper surface, both of said surfaces lying in substantially the same plane;

clamping means for relatively moving the members translationally towards and away from one another and angularly in a horizontal plane;

said clamping means including two independently operable devices;

means for operatively coupling said devices and said first member and producing angular movement of said first member relative to said second member when one device is operated without operating the other device;

said coupling means for at least one of said devices including means movable along a horizontal arc with respect to said second member so as to move in a direction having a lateral component to accommodate said angular movement;

said first member being capable of being moved angularly in both directions from a position in which it lies parallel to said second member; and

guide and support means underlying said vise members for supporting said vise members and for maintaining the clamping face of the first member substantially vertical during both its translational and its angular movement, and when a workpiece is clamped between the clamping faces at any position therebetween, and for restricting said lateral component of movement of said coupling means

substantially to that which occurs when said one device only is operated to move said first member through its full range of angular movement;

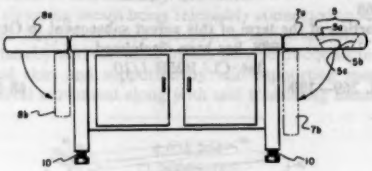
wherein said coupling means and said guide means enable positive control by said devices of the position of the clamping faces such that a workpiece can be gripped between lineally extending portions of the clamping faces which are outboard and above the line of reaction of the devices.

4,076,230

PORTABLE, READILY STORABLE PATIENT TREATMENT TABLE

Allan R. Pike, Portland, Oreg., assignor to Jerome S. Marger, Portland, Oreg., a part interest

Filed Jun. 12, 1975, Ser. No. 586,348
Int. Cl.² A47G 9/00
U.S. Cl. 269—328 **9 Claims**



1. A portable, readily storable patient treatment system which comprises:

(a) a base;

(b) a longitudinally-extending patient platform mounted on said base in a substantially horizontal plane above the surface on which it resides;

(c) a footrest section upon which the patient's feet rest included at one end of said longitudinally-extending patient platform;

(d) a headrest section included at the other end of said longitudinally-extending patient platform, having an aperture containing therein, which accepts and retains a patient head in proper position within said aperture in a steadfast manner thereby maintaining the position of the patient's body in proper alignment without the use of auxiliary retaining means, the preponderance of the patient's head resting within said headrest section; and

(e) a portable elevated head support, including insert means for mating engagement in said aperture, provided for maintaining the patient's head in an elevated position during said treatment process.

4,076,231

APPARATUS FOR TRIMMING SIGNATURES

Willi Albert Peter Kutzner, and Georg Schneider, both of Wurzburg, Germany, assignors to Koenig & Bauer Aktiengesellschaft, Wurzburg, Germany

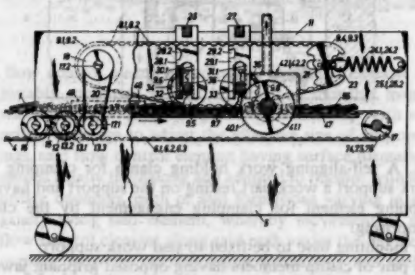
Filed Nov. 30, 1976, Ser. No. 746,049
Claims priority, application Germany, May 12, 1975, 2554662
Int. Cl.² B41F 13/56
U.S. Cl. 270—21 **9 Claims**

1. An apparatus for trimming at least a first edge from each one of a plurality of folded signatures while in an overlapped array, said folded signatures being produced in a web-fed rotary printing press, said apparatus comprising:

a generally planar support table, said table including at least one bottom conveyor belt and at least one top conveyor belt, said bottom and top belts receiving said folded signatures therebetween in said overlapped array from the press and carrying said signatures along said table;

means for causing downward pressure on said at least one top conveyor belt to press said overlapped array of signatures against said bottom conveyor belt; and

at least a first rotating trimming tool carried on said table, said trimming tool contacting said first edge portion of each said signature to trim each said signature as said signatures are moved past said trimming tool in said overlapped array.



9. A method of trimming at least one edge portion of each one of an overlapped array of folded signatures produced in a web-fed rotary printing press, said method comprising:

receiving said overlapped array of folded signatures from said printing press on conveying means;

holding said overlapped array of folded signatures on said conveying means from above and below;

conveying said overlapped array of folded signatures past at least one rotating trimming wheel; and

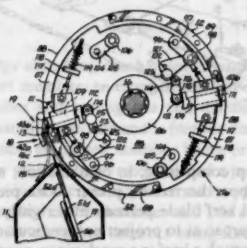
trimming said at least one edge portion of each of said folded signatures while said signatures are in said overlapped array, whereby each said signature is trimmed while in said overlapped array.

4,076,232

APPARATUS FOR LIFTING AND CONVEYING A SIGNATURE FED ON A WEDGE-SHAPED SADDLE

Hermann Kistner, Tamm, and Gunthart Lehmann, Heubach, Lautern, both of Germany, assignors to Maschinenbau Oppenweiler GmbH, Oppenweiler, Germany

Filed Mar. 31, 1976, Ser. No. 672,434
Claims priority, application Germany, Apr. 4, 1975, 2514838
Int. Cl.² B65H 39/02
U.S. Cl. 270—54 **21 Claims**



1. In an apparatus for lifting and advancing a signature consisting of sheets which are folded together about a common fold line defining a signature back having an outer and an inner

side and delimiting a back margin of the signature, the combination of:

a frame,

a wedge-shaped saddle having a vertex for supporting the inner side of the signature,

lifting means for lifting the signature from said saddle,

said lifting means being mounted for reciprocating up-and-down movement,

at least one conveyor having an inlet and an outlet for conveying the signature in a direction from said inlet along a path to said outlet,

a transfer station in a fixed position relative to said frame, in which transfer station the signature lifted by said lifting means is transferred to said inlet of said conveyor,

said conveyor comprising first and second conveyor elements having first and second endless conveyor surfaces respectively, and being supported on said frame for revolution of said first and second conveyor surfaces in opposite directions of revolution so that parts of said first and second conveyor surfaces move in said conveying direction and define a clamping gap between said parts of said surfaces for clamping the signature, said gap forming a mouth arranged at a distance downstream of said inlet for receiving the signature and extending along said conveyor path for conveying the signature to said outlet,

said conveyor further comprising at least one pressing means for pressing the signature lifted by said lifting means to said first conveyor surface at said transfer station and for moving it thereby into said mouth of said clamping gap, said pressing means being mounted for reciprocating movement from a release position for receiving the signature from said lifting means to a clamping position for pressing the signature to said first conveyor surface for a clamping period and for moving together with said first conveyor surface at least for said clamping period,

first drive means for driving at least one of said conveyor elements,

second drive means for said reciprocating up-and-down movement of said lifting means,

third drive means for said reciprocating movement of said pressing means from said release position to said clamping position and back,

said first, second and third drive means being operatively connected to each other so that said lifting means reaches said transfer station at a moment and at a speed, when said pressing means is in said release position and starts its movement to said clamping position, and said speed of said lifting means substantially equalling the speed of said first conveyor surface.

4,076,233

DOCUMENT HANDLING APPARATUS

Clifford Knight, Mitcheldean, and Peter M. Thorp, Lydbrook, both of England, assignors to Xerox Corporation, Stamford, Conn.

Filed May 17, 1976, Ser. No. 687,062

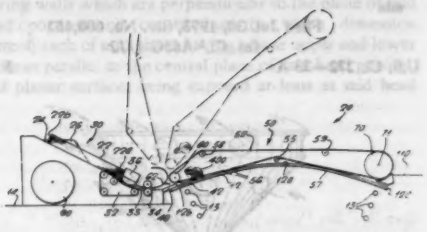
Claims priority, application United Kingdom, Oct. 24, 1975, 43930/75

Int. Cl.² B65H *9/04, 5/02*

U.S. Cl. 271—233 **3 Claims**

1. A document handling apparatus for a copying machine, comprising a document transport means including a single, narrow width, endless document-moving belt extending between first and second roller means and movable over a relatively wide surface of a document processing station, said roller means being located on opposite sides of said surface to centrally locate said belt over said surface, whereby in operation said belt engages a generally central portion of a document to move said document over said surface, and

support means for supporting said belt at an intermediate point between said first and second roller means, said intermediate point being generally halfway between said first and second rollers so that said belt contacts said surface in



two separated areas on opposite sides of said intermediate point.

4,076,234

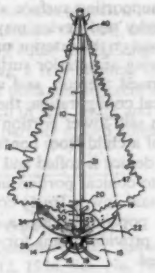
ARTIFICIAL SNOW CIRCULATING APPARATUS

Jack Burnbaum, Newton, Mass., assignor to Bradford Novelty Co., Inc., Boston, Mass.

Filed Jun. 28, 1976, Ser. No. 700,612

Int. Cl.² A63J *5/02*

U.S. Cl. 272—15 **12 Claims**



1. In apparatus for use with a tree for continuously cascading artificial snow particles through the branches thereof, said apparatus including a particle collecting receptacle having an interior surface which, when said receptacle is installed at the base of the tree, is inclined to guide particles into a bottom sump portion of said receptacle, a blower having an inlet conduit for taking up particles contained in said sump portion and an outlet conduit for delivering said particles to a point adjacent the top of the tree, and deflecting means which, when installed atop the tree, directs particles received from said outlet conduit downwardly through the branches of the tree and into said receptacle, the improvement wherein

said receptacle comprises a conical member,

said conical member forms said interior surface with sufficient smoothness and sufficient downward incline from the periphery thereof to the cone axis so that gravitational force alone moves the particles along said interior surface to said sump portion,

the center of said conical member has an aperture for receiving the trunk of the tree, whereby said receptacle can be installed about the lower portion of the trunk of a tree mounted on a stand located below said receptacle, and

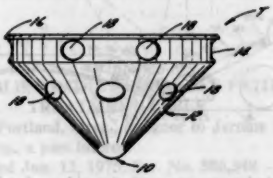
said conical member includes means for sealingly engaging said interior surface with the tree trunk passing through said aperture for containing particles within the sump portion, said sealing means comprising an upwardly directed extension of said interior surface of being adjustable for installing said conical member in sealing engagement with variously sized tree trunks.

4,076,235

ENTERTAINMENT AND EXERCISE DEVICE

Carl Risberg, Jr., 160 Hampshire, Beaconsfield, Quebec, Canada

Filed Jul. 30, 1975, Ser. No. 600,452
Int. Cl.² A63G 1/12
U.S. Cl. 272—33 A 3 Claims



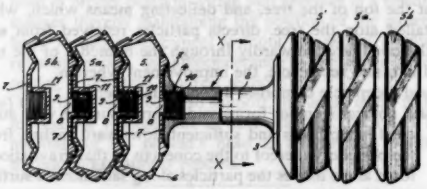
1. A toy device for children adapted for a rotational and rocking movement on a supporting surface, said toy device consisting of a one-piece integral member of a plastics material having a lower portion and an upper portion, said lower portion forming a base seating area adapted to receive a child in a seating position, said lower portion being of a frusto-conical configuration having inwardly and downwardly tapering side walls meeting at a rounded apex, said rounded apex forming a pivot point about which said device rotates, said side walls tapering inwardly at a constant agle such that the exterior surface of said side walls of waid lower frusto-conical portion contacts a planar supporting surface along substantially their entire length whereby said device may be rolled and rotated about said pivot point on the exterior surface of said side walls, said side walls having an interior surface with a plurality of concentric ribs formed thereon, said upper portion having a generally cylindrical configuration, the upper portion extending upwardly from said lower portion a distance sufficient to protect the hand of a child from contact with the supporting surface when said device is rolled and rotated with said walls of said lower frusto-conical portion in contact therewith, an upper portion of said lower frusto-conical portion and said cylindrical upper portion having a plurality of apertures formed therein to provide means for entry of air when said device is overturned.

4,076,236

BAR-BELL TYPE EXERCISING DEVICE

Stefan Ionel, 14, rue Michel Servet, 1206 - Geneva, Switzerland

Filed Jan. 21, 1976, Ser. No. 650,984
Claims priority, application Switzerland, Jan. 21, 1975, 693/75
Int. Cl.² A63B 11/00
U.S. Cl. 272—123 6 Claims



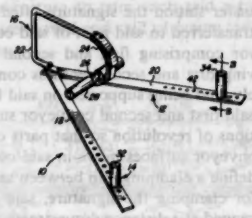
1. A hantel comprising a handle and at least two hollow bodies removably connected to each end of the handle, and a male coupling member interengaged in a female coupling member between the handle and each said hollow body connected to the handle, said coupling members being on said handle and said hollow bodies, each said hollow body connected to the handle having a coupling member thereon corresponding to the coupling member carried by the handle but on the side of the hollow body opposite the handle, thereby to permit the connection together of two said hollow bodies at the same end of the handle, each said hollow body having a filling opening closed by a plug, the plug closing one said coupling member of the hollow body.

4,076,237

SPRING TYPE BACK TRACTION EXERCISER

Melvin A. Dussia, 7511 N. 47th Ave., Glendale, Ariz. 85301

Filed Mar. 21, 1977, Ser. No. 779,502
Int. Cl.² A63B 21/04
U.S. Cl. 272—136 11 Claims



1. A back traction exercising apparatus comprising in combination:

(a) a frame positionable on a flat surface and having first and second end sections;

(b) body retention means coupled to the first end section of said frame for maintaining the upper torso of the individual's body in a fixed horizontal position with respect to a flat surface as the individual exercises; and

(c) spring means coupled to the second end section of said frame and mounted on only one upwardly extending frame member, and said spring means being of only one single leaf spring extending downwardly so that the terminal end thereof contacts the body of the individual utilizing said apparatus in the area where his legs join his lower torso for opposing upward movement of his pelvic region as his knees are moved upward toward his chest thus causing a substantially constant horizontal traction force to the lower spine as the individual performs exercises on said apparatus;

whereby the traction force is applied to the lower vertebrae of the individual's spine by the opposing forces exerted on his torso by said body retention means and said spring means.

4,076,238

AMUSEMENT DEVICE

Robert M. Dively, Port Matilda, Pa., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed May 27, 1977, Ser. No. 801,227
Int. Cl.² A63F 9/00
U.S. Cl. 273—1 R 1 Claim

1. An amusement device, comprising

a handle member having a hollow elongated shaft having spaced opposite first and second ends, a handle compo-

nent coaxially affixed to the shaft around the first end thereof, said shaft having a tapered bore formed therein in the area of the second end thereof and extending substantially radially; and

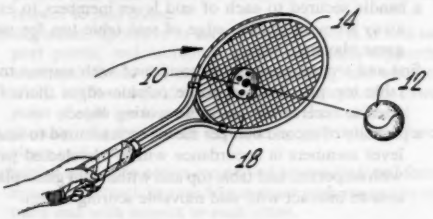
a balance member having an elongated rod having spaced opposite first and second ends, the first end of the rod being tapered to seat in the bore formed in the handle member, and said balance member having a balance device affixed to the second end of the rod, said rod fitting in said shaft, when not in use, with the balance device protruding therefrom and whereby a user attempts to balance the balance member in upright position on the handle member by placing the first end of said rod in the bore of said handle member, holding said handle member substantially horizontal and positioning said balance member substantially upright.

4,076,239

TENNIS TEACHING AID

Charles O. Hall, San Bernardino, Calif., assignor to Sherman R. Plummer, Burbank and Randall Porter, Homewood, both of, Calif., part interest to each

Filed Jul. 29, 1976, Ser. No. 709,798
Int. Cl.[2] A63B *69/38*
U.S. Cl. 273—29 A **7 Claims**



1. A device for providing an audible indication when a tennis ball is struck with a desired area of a tennis racket, said device comprising:

two thin flat plates, each having a smaller planar area than that of the head of a conventional tennis recquet and being of stiff but resilient material disposable one on each side of the strings of the head of a tennis racket at the desired area;

at least one area of padding material having a smaller planar area than each of said plates and affixed to the side of each of said plates between each of said plates and the strings; of the head of the tennis recquet and

a plurality of compressing fasteners attached to said plates and disposable through graps between the strings, for attaching said plates together onto the strings;

whereby said padding material causes said device when disposed on a racket and struck by a tennis ball to emit a first distinctive sound when struck at its center and a second distinctive sound when struck at an off-center location, but has little or no significant effect on the ball rebound characteristics of the racket.

4,076,240

HOCKEY STICK

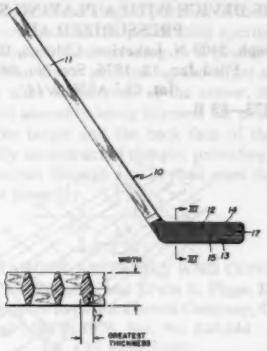
Daniel G. Haddad, 25 Columbus St., Worcester, Mass. 01603

Filed Jan. 26, 1976, Ser. No. 652,425
The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.
Int. Cl.[2] A63B *59/14*
U.S. Cl. 273—67 A **8 Claims**

1. A hockey stick, comprising:

a. an elongated handle having an end, and

b. a blade having a contact surface, the blade being rigidly mounted on the end of the handle and consisting of a rigid, one-piece, homogenous frame having a head portion consisting of an entirely open-celled network of a plurality of interconnected plates traversing the entire area thereof and forming a honeycomb-like matrix; each of said plates having walls which are perpendicular to the plane of said head portion and constituting the width dimension thereof; each of said plates having planar upper and lower surfaces parallel to the central plane of said head portion, said planar surfaces being exposed at least at said head



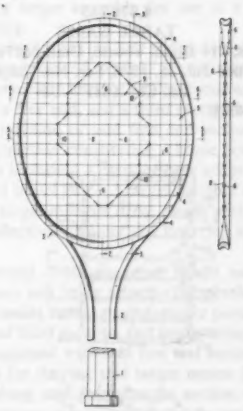
portion and constituting two contact surfaces of said head portion, the planar surfaces of each of said plates constituting the length dimension thereof; said width dimension being approximately equal to said length dimension; each plate further having a non-uniform thickness with one location of greatest thickness wherein said greatest thickness is less than each of said width and length dimensions and being oriented parallel to said contact surfaces of said head portion.

4,076,241

SPORTS RACKET

Ernest L. Newsome, 6 Densmore Ave., Auburn, N.Y. 13021

Filed Jul. 12, 1976, Ser. No. 704,386
Int. Cl.[2] A63B *51/06*
U.S. Cl. 273—73 D **5 Claims**



1. A sports racket comprising a head having a frame, a plurality of transversely and longitudinally extending string elements mounted within and connected to said frame to form a ball-engaging surface on each face of the racket, said string elements being interconnected in such a manner to form a substantially flat surface in the sweet spot area on each face of the racket disposed radially inwardly a substantial distance

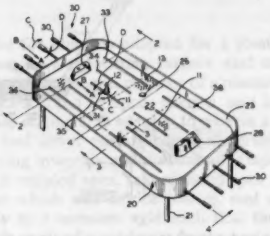
from the periphery of the frame, and a sloped surface on each face of the racket extending radially outwardly from the perimeter of the sweet spot area to said frame, thereby forming substantially concave ball-engaging surfaces on each face of the racket head, whereby various undesirable actions and reactions occasioned by a ball striking the face of the racket anywhere but on the sweet spot are compensated.

4,076,242

GAME DEVICE WITH A PLAYING SURFACE OF PRESSURIZED AIR

Mark Joseph, 2400 N. Lakeview, Chicago, Ill. 60614

Filed Jan. 12, 1976, Ser. No. 648,092
Int. Cl.[2] A63F 9/14
U.S. Cl. 273—85 B **12 Claims**



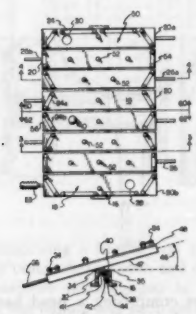
1. A game device having a horizontal playing surface, a playing piece for sliding over said surface, playing piece controller means for imparting energy and for directing the playing piece to cause it to slide, means comprising a source of air pressure for forming a boundary layer of pressurized air above at least part of said playing surface, said playing piece sliding over said boundary layer, said air pressure means comprising a completely enclosed air chamber having a perforated upper side adjacent said playing surface for discharging said boundary layer of air over said playing surface, said air chamber having walls formed therein to provide access means for enabling said playing piece controller means to be operated from points below said chamber for directing said playing piece without loss of air pressure within said chamber.

4,076,243

TABLE GAME

David R. Davis, 214 Birch, Tooele, Utah 84074

Filed Jul. 26, 1976, Ser. No. 708,916
Int. Cl.[2] A63F 7/06
U.S. Cl. 273—85 E **21 Claims**



16. A table game comprised of a movable scoring object and a game table, said game table comprising:

support means to support said game table;

an elongated fulcrum member mounted to said support means, said fulcrum member having a substantially flat top surface extending along its length which has substantially parallel outside edges;

a table top comprised of a plurality of side-by-side lever members transversely mounted to said fulcrum member each pivotable thereabout in a plane substantially normal thereto in clockwise and counterclockwise directions through a preselected arc;

mounting means to pivotably mount each said lever member to said fulcrum member, said mounting means including resilient means to cause said lever members to return to the plane of said table top after movement therefrom and a pin member centrally secured to each of said lever members which extends through a corresponding aperture formed in said flat top surface, said resilient means being comprised of a spring positioned about said pin member between said flat surface and the distal end of said pin member to compress upon pivoting said lever member about the outside edges of said flat surface of said fulcrum member and to force the lever member back to the plane of said table top after movement therefrom;

a plurality of first bumper means each secured to a lever member along the outside edges of said table top to form a game playing area on said table top and to contain said movable scoring object on said table top;

a handle secured to each of said lever members to extend away from an outside edge of said table top for use by game players;

first and second goal means positioned with respect to said table top proximate opposite outside edges thereof and sized to receive said movable scoring object;

a plurality of second bumper means each secured to selected lever members in accordance with a preselected pattern with respect to said table top and within said game playing area to interact with said movable scoring object.

4,076,244

PLAYING PIECE FOR TABLE SOCCER

Eugene Lee Peppard, 3537-46th Northeast, Seattle, Wash. 98105

Filed Sep. 20, 1976, Ser. No. 724,474
Int. Cl.[2] A63F 7/10
U.S. Cl. 273—85 D **4 Claims**

1. A playing piece for use in a table game such as table soccer wherein a ball is propelled and controlled by the playing piece comprising:

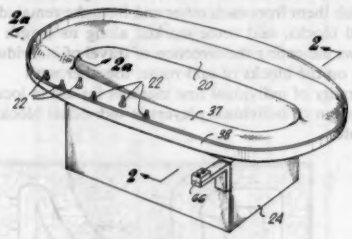
an elongated body element, an upper portion designed to be secured to a horizontal rod for movement about a horizontal axis with said rod, a lower ball contacting foot portion including front and back portions which are substantially planar and converge toward the bottom whereat they are tangential with and joined by a smooth continuous uniform curve, whereby the player is assured of good control and a maximized strike surface and strike zone while retaining a definite and significant pin zone.

4,076,245

RACING GAME AND GAME PIECE

Benjamin F. Monroe, 1065 E. Flamingo Road, Apartment 506, Las Vegas, Nev. 89109

Filed Aug. 5, 1976, Ser. No. 712,014
Int. Cl.[2] A63F 9/14
U.S. Cl. 273—86 C 8 Claims



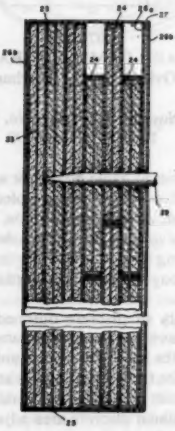
1. A racing game comprising:
a platform having an endless track formed thereon;
a supporting frame;
mounting means for mounting said platform on said frame to permit said platform to be tilted in any direction with respect to said frame;
tilting means operative to support said platform at two support points, and including a pair of weight-supporting arms and means for raising and lowering said arms cyclicly, to tilt said platform in such a manner that the lowest point of said track progresses around the track; and
a plurality of game pieces movable by gravitational forces along said track;
whereby said game pieces are moved by gravitational forces around said track in a random manner with respect to said track and with respect to each other.

4,076,246

TARGET PARTICULARLY FOR ARCHERY

Leonard S. Meyer, 6449 Bridgewood Road, Columbia, S.C. 29206

Continuation-in-part of Ser. No. 533,942, Dec. 18, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 631,893
Int. Cl.[2] F41J 3/00
U.S. Cl. 273—102 B 26 Claims



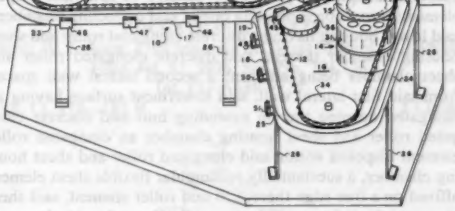
1. An archery target comprising an assembly of a multiplicity of superimposed parallel membranes of sheet resin material, and a multiplicity of parallel layers of resilient and porous material interposed between and each serving to interspace at least a plurality of the membranes, the membranes and layers being secured together in assembled relation with a multiplicity of the membranes and a multiplicity of the interposed layers of porous material overlying each other in parallel relation in all areas of the assembly and the assembly having a front or target face and a back face, the membranes being penetrable by an arrow cast at the target face and being resilient and tear resistant, and the layers of resilient and porous material being penetrable by an arrow cast at the target and providing freedom for formation of sleeve shaped portions of the membranes engaging the arrow around the penetration apertures to provide for imposition of frictional drag in a plurality of zones along the shaft of an arrow penetrating the target and also for partial recovery after withdrawal of the arrow, the front or target face of said assembly being exposed for penetration by arrows cast at the target and the back face of the assembly being substantially unobstructed thereby providing for partial penetration of arrows through and beyond even the rearmost membrane of the assembly.

4,076,247

MOVING TARGET ASSEMBLY AND CONTROL

Raymond W. H. Kim, Skokie, and Erwin E. Figge, Des Plaines, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed May 7, 1976, Ser. No. 684,044
Int. Cl.[2] F41J 9/00
U.S. Cl. 273—105.6 17 Claims



1. A moving target assembly for use in a target practice range comprising:
a target travel quite having first and second straight sections, said first and second straight sections being joined and being substantially at right angles to one another and each including a free end, and a third section connected to the common junction of said first and second sections, said common junction constituting a home position;
target means including a carriage base adapted for traveling within said travel guide, a target member on said carriage base, and target member drive means within said carriage base for selectively raising and lowering said target member;
first and second chain engaging means mounted on said target means and being selectively operable;
chain drive means running substantially parallel to said first, second, and third sections, and being arranged for cooperative engagement with said first and second chain engaging means for driving said target means from said home position along said first straight section when said first chain engaging means is selectively operated, and for driving said target means from said home position along said second straight section when said second chain engaging means is selectively operated; and
a plurality of trip switches spaced along said first and second straight sections, each said switch being capable of actuation by said target means and selectively operable, each said trip switch also being coupled to said target drive means for causing said target member to be lowered re-

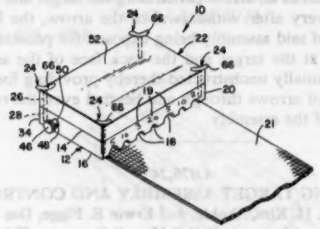
sponsive to the actuation of a selectively operated one of said trip switches by said target means.

4,076,248

MARBLE GAME WITH RETRACTABLE PLAYING SURFACE

Guy Goulet, and John Goulet, both of 400 Kings Point Drive, N. Miami Beach, Fla. 33160

Filed May 7, 1976, Ser. No. 684,284
Int. Cl.[2] A63F *3/00, 7/00*
U.S. Cl. 273—123 R **3 Claims**



1. A game apparatus for use with marbles or the like comprising a lower housing having a lowermost surface utilized to support said lower housing on a horizontal supporting surface, said lower housing having a plurality of discrete collecting chambers therein, said lower housing having a plurality of apertures disposed in a first lateral wall thereof, each of said apertures adapted to permit the passage of spherical shaped elements into a corresponding one of said collecting chambers, said lower housing having a discrete elongated roller and sheet housing chamber therein, said discrete elongated roller and sheet chamber being adjacent a second lateral wall spaced from said first lateral wall, said lowermost surface having an elongated opening therein extending into said discrete elongated roller and sheet housing chamber an elongated roller element disposed within said elongated roller and sheet housing chamber, a substantially rectangular flexible sheet element affixed on a free edge thereof to said roller element, said sheet element adapted to pass downwardly through said elongated opening and thence extending outwardly horizontally toward said apertures and thereinfront said sheet element thereby serving as a playing surface, rotatable securing means for rotatably securing said roller element within said elongated roller and sheet housing chamber, rotating means for rotating said elongated roller element and for wrapping said sheet therearound into a storage position within said roller and sheet housing, a portion of said rotating means accessable outside said lower housing, further comprising an additional upper hollow housing having a base portion and a plurality of longitudinal perpendicular side walls affixed to the edges of said base portion forming a chamber having an open side, said chamber divided into a plurality of sub-chambers, the free edges of said side walls adjacent said open side dimensioned to contact the uppermost surface of said lower housing when placed thereagainst, first affixing means for securing said upper housing to said lower housing thereby securing the contents of said sub-chambers therein.

4,076,249

DEVELOPMENT BOARD GAME APPARATUS

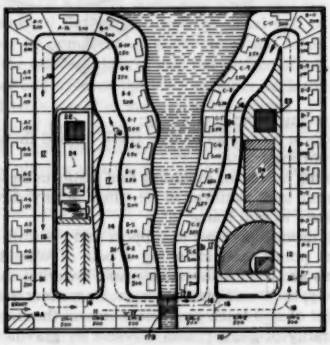
James W. Sneathen, Jr., Berlin, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Apr. 15, 1976, Ser. No. 677,306
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—256 **1 Claim**

1. A game apparatus for use in a game that is played on a marked board to simulate the development of a real estate subdivision, and the various stages of construction of individual buildings on lots in a said real estate subdivision, comprising

a game board, said game board marked in the form of a route laid along connecting streets, with the route marked with dividing lines to form individual blocks, with each said block bounded on one side by a marked lot indentified by an index insignia and by a purchase price, with at least two blocks, each marked with contrasting indicia that distinguish them from each other and from the remainder of the said blocks, said route marked along its length with arrows indicating the direction of travel of individual markers on the blocks of said route, together with

a plurality of individual first markers for use in locating the position of individual players in individual blocks of said route,



a plurality of individual second markers for use by the players in placing on individual lots, said second markers distinguishable in appearance from said first markers,

play money for purchasing individual contracting services required in the construction of a building on a said lot,

play cards marked to represent individual constracting services required in the construction of a building on a said lot,

a set of reward cards and a set of penalty cards to be used by players whose markers have landed on any block marked with one of said contrasting indicia, and

random number generating means for use by the players in moving their markers on the said route of blocks.

4,076,250

BOARD GAME APPARATUS

Emilio Azcarate, Oviedo 18-16, Torrimar, Guaynabo, P.R. 00657

Filed Nov. 22, 1976, Ser. No. 743,849
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—251 **4 Claims**

1. A convict retrieval game board for a plurality of players each provided with a unique playing piece and comprising a flat stationary board having defined on a surface thereof a plurality of successively outlined areas defining a plurality of paths for the playing pieces which are individually moved a number of areas along the path in accordance with a throw of the dice,

a second plurality of discrete outlined areas representing houses, each having only one simulated entranceway from one of said paths for entry by the unique playing pieces,

a starting point for the playing pieces at one end of the path and a finish point at the opposite end of the path,

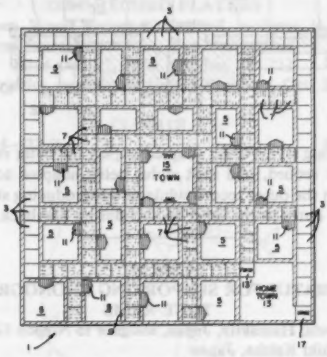
an additional outlined discrete area adjacent the finish point being designated as home town,

a disc located in each house area, said disc being blank on at least the one side that is visible,

a first plurality of said discs each having a symbol on the opposite side depicting an outlaw,

a second plurality of said discs each having a symbol on the opposite side depicting a gun,

one of the discs bearing a unique symbol on its opposite side different from the other symbols depicting the main object which is being sought by the players,



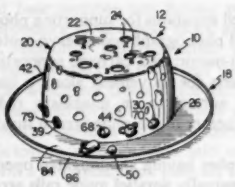
a further discrete outlined area on said board designated as a jail and having a plurality of simulated entranceways, one from each path of a plurality of paths for entry therein of a player's piece if accompanied by a disc having an outlaw symbol retrieved by a player whose piece had previously entered a house area containing said disc.

4,076,251

AMUSEMENT DEVICE INCORPORATING SIMULATED CHEESE AND MICE

James R. Hornsby, Jr., 6239 Edgewater Drive, Orlando, Fla. 32810

Filed Jan. 26, 1977, Ser. No. 762,640
Int. Cl.² A63F 7/10
U.S. Cl. 273—138 R **10 Claims**



1. An amusement device incorporating simulated cheese and mice comprising:

a base plate;

a simulated cheese in the form of a substantially cylindrical body having a closed top portion with a plurality of randomly spaced inlet orifices therein and an open bottom portion, said bottom portion resting on said base plate,

said cylindrical body having a plurality of exit orifices on the cylindrical wall thereof spaced above said bottom portion;

at least one simulated mouse of a size and shape to fit releasably into an exit orifice and to be discharged therefrom upon impact by a spherical body, the number of said mice being less than the number of said exit orifices;

an inverted conical member, having a central hole therein, disposed in said cylindrical body for the reception of a spherical body deposited in any of said inlet orifices and for directing said body through said central hole; and

means for randomly distributing a spherical body from said central hole toward a randomly selected exit orifice,

whereby the spherical body passes through the randomly selected exit orifice unimpeded if there is no mouse present therein and forces the mouse out the randomly selected exit orifice if a mouse is present therein.

4,076,252

FLIP TOP AND PLATFORM

Harold J. Bernier, 906 W. Travis, and Norman F. Daniels, 910 W. Travis, both of Harlingen, Tex. 78550

Filed Sep. 13, 1976, Ser. No. 722,794
Int. Cl.² A63F 5/04; A63H 1/00
U.S. Cl. 273—141 R **2 Claims**

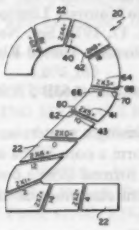
1. In a flip top and platform, the combination of a top of hemispherical shape and a circular platform that is downwardly dished for spinning said top thereupon; said top including a hemispherical surface and a flat circular end, said top being molded of transparent, solid plastic and containing an arrow molded therewithin; said platform being divided into twelve sectors, each defined with a different scoring numeral.

4,076,253

EDUCATIONAL PUZZLE

Diane W. Eriksen, 1796 Macapin St., West Milford, N.J. 08848

Filed Jul. 12, 1976, Ser. No. 704,726
Int. Cl.² A63F 9/10
U.S. Cl. 273—157 R **2 Claims**



1. An educational puzzle comprising a plurality of substantially flat components each having at least one counterpart edge that is intended to be placed in juxtaposition with the counterpart edge of another said component, a printed portion on each component located along and associated with each said counterpart edge on each said component, said printed portions including a plurality of pairs of said printed portions which cooperate to indicate counterpart edges located on separate components which are complementary and are intended to be placed in juxtaposition, said complementary edges being of complementary shape so that they may be placed into substantially coextensive engagement, each of said pairs of said printed portions being different than the other said pairs of said printed portions, at least one of said components having at least two printed portions spaced from each other located along discrete edges of said component to indicate at least two distinct counterpart edges thereon, so that when all said complementary counterpart edges on said components of said puzzle are placed in the proper juxtaposition indicated by said pairs of printed portions a predetermined figure is formed, said predetermined figure having a relationship to each of said pairs of

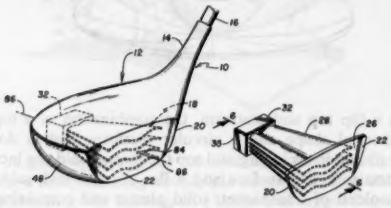
said printed portions, one of said printed portions of each said pair of printed portions including a mathematical problem, and the other printed portion of each said pair including a correct answer to said mathematical problem, each of said mathematical problems being a different mathematical problem and an appropriate answer, said mathematical problems including multiplication, and each said problem including a common multiplier, and said predetermined figure being substantially the shape of said common multiplier.

4,076,254

GOLF CLUB WITH LOW DENSITY AND HIGH INERTIA HEAD

Gordon W. Nygren, 321 Spring Valley Dr., Bloomington, Minn. 55420

Filed Apr. 7, 1976, Ser. No. 674,456
Int. Cl.² A63B *53/04*
U.S. Cl. 273—173 **20 Claims**



1. In a golf club, a head comprising a face plate, weight means spaced rearwardly from said face plate, a plurality of spaced plates, each of said plates extending from said face plate to said weight means, and material encasing said plurality of plates and said weight means to form an aerodynamically curved outer surface.

4,076,255

GOLF BALLS

Travis Moore, and Hugh David Niblock, both of Dumfries, Scotland, assignors to Uniroyal Limited, Scotland

Filed Dec. 17, 1975, Ser. No. 641,477
Claims priority, application United Kingdom, Dec. 30, 1974, 56037/74
Int. Cl.² A63B *37/06*
U.S. Cl. 273—226 **19 Claims**

1. A golf ball comprising a center, an elastic thread wound around the center to form a core, and a cover molded onto the core, the center being formed from a composition comprising:

(1) a cis-polybutadiene elastomer having a cis-content of not less than 80%;

(2) not more than 25 parts by weight per hundred parts of elastomer of a monomer capable of grafting, cross-linking or chain extending the elastomer said monomer is selected from the metal salt of an unsaturated carboxylic acid and a polyol ester or anhydride of a polybasic unsaturated carboxylic acid; and

(3) not less than 135 parts by weight per hundred parts of elastomer of an inert filler; said composition being cured and having a Shore C hardness of not less than 60° and being characterized by not requiring freezing of the center in order to wind the elastic thread around the center.

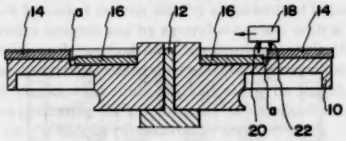
4,076,256

STYLUS SHIFT MECHANISM FOR A PHONOGRAPH HAVING TWO CONCENTRIC RECORDS

Katsumi Watanabe, Kawasaki, Japan, assignor to Ozen Co., Ltd., Tokyo, Japan

Filed Jul. 16, 1976, Ser. No. 705,957
Claims priority, application Japan, Apr. 1, 1976, 51-36275
Int. Cl.² G11B *3/34, 3/80*
U.S. Cl. 274—1 R **6 Claims**

1. In a phonograph of the type having an annular outer record and an inner record arranged concentrically for simultaneous rotation, the improvement comprising a pickup arm pivotally supported at one end, a reproducing stylus carried by said pickup arm at the other end thereof, and a shift stylus also carried by said pickup arm at said other end thereof, said



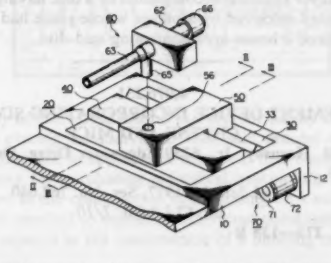
reproducing stylus being adapted to play the outer record then the inner record, said shift stylus being adapted to ride in a groove in the outer record while said reproducing stylus shifts from the outer to the inner record during playback.

4,076,257

APPARATUS FOR SUPPORTING PHONOGRAPHIC TONE ARMS

Motoi Iyeta, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Oct. 22, 1976, Ser. No. 734,961
Claims priority, application Japan, Oct. 23, 1975, 50-144791
Int. Cl.² G11B *3/10*
U.S. Cl. 274—23 A **15 Claims**



1. Improved apparatus for supporting phonograph tone arms in which said phonograph has a servo-motor; carriage driven by said servo-motor; said carriage supporting a tone arm and its related parts for movement along a linear path which is substantially normal to an imaginary radial line extending between the center of the phonograph turntable and said path comprising:

a base member having an elongated opening;

a pair of mutually parallel guide rails arranged on said base member while being spaced from each other along said base member opening and extending in the direction of movement of said carriage substantially over the entire moving ambit of the latter;

an elongated cover arranged between said guide rails extending substantially over the entire moving ambit of the carriage, projecting above the top surfaces of said guide rails and defining an elongated horizontal slit extending along the back thereof;

said carriage having a horizontal passageway by way of which said carriage spacedly and movably rides over said cover;

front and back wheel assemblies each having wheels; mounting means for said assemblies in said carriage; said wheel assemblies being movable on and along said guide rails while supporting said carriage above said guide rails;

one of said guide rails cooperating with its associated wheels to restrain movement of said carriage in a direction transverse to said linear path;

a bottom block forming an integral part of said carriage and extending downwardly through the elongated opening formed in said base member and the horizontal slit of said cover, and

a driving mechanism for said carriage disposed relative to said bottom block of said carriage operatively coupled to said servo-motor.

4,076,258

DISC-RECORD PLAYERS

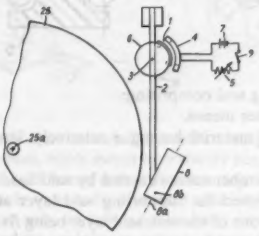
John Pelham Wren, Swindon, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Oct. 27, 1976, Ser. No. 736,222

Claims priority, application United Kingdom, Oct. 28, 1975, 44399/75

Int. Cl.² G11B *3/10*

U.S. Cl. 274—23 R **9 Claims**



1. A skating-force compensation device for a gramophone pickup arm mounted on an arm support arranged for joint pivotal movement about a vertical axis relative to a base member, which comprises: a permanent magnet means mounted for joint movement with the arm support about said axis and constructed and magnetized to provide two pole faces of opposite polarities, both arranged substantially in a common surface of revolution about said vertical axis with each said pole face extending over an angle about said axis at least equal to the angle of operative movement of the pickup arm about said axis, said magnet means being magnetized at right angles to each pole face; a winding of conductor wire, mounted to be stationary relative to said base member and having two portions arranged in close proximity to said pole faces, said two portions arranged for respective electrodynamic co-operation with the flux from each of said pole faces; and yoke means of magnetizable material which are mounted for joint movement with said magnet means and arranged to form a yoke surface facing each said pole face at such a distance therefrom as to provide a gap sufficient to accommodate said winding portions, and which form a low-reluctance path for the magnetic flux of each said pole face beyond said gap, the lengths of conductor wire in each said portion extending substantially parallel to said surface of revolution and at right angles to the velocity vector of that element of said surface which directly faces the respective portion, said winding portions being electrically connected in series in such manner that when the winding is energised, the electric current flow in each of said winding portions produces, with the magnet flux passing said portion from the magnet means, torque about said axis in the same direction so as to counteract the skating-force of said tone arm.

4,076,259

STATIC SEALING MECHANISM FOR LIQUID NATURAL GAS COMPRESSORS AND HYDROGEN COOLED GENERATORS

Albert A. Raimondi, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 29, 1976, Ser. No. 736,804

Int. Cl.² F16J *15/34*

U.S. Cl. 277—3 **14 Claims**

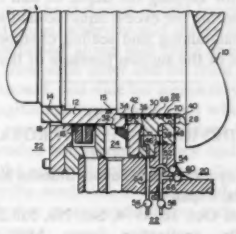
1. An apparatus containing a sealed fluid comprising:

a nonrotatable, fluid-tight casing which envelops said sealed fluid;

a rotatable shaft extending through said casing;

dynamic sealing means for preventing sealed fluid leakage from the casing's shaft opening during shaft rotation, said dynamic sealing means being selectively actuatable and having sealing capability independent of said shaft rotation;

a piston disposed around a predetermined length of said shaft with an annular space therebetween, said piston having a plurality of faces extending substantially radial in relation to the shaft's axis of rotation, a first of said faces being arranged to be in contact with said sealed fluid during shaft rotation, a second and third of said faces being situated on axially opposite ends of said piston;



a seating member situated axially adjacent to said first piston face extending radially from the shaft's axis of rotation with said seating member attached to and surrounding a selected length of said shaft;

controlling means for selectively providing fluid communication to said second face from a low fluid pressure source P_L and a high fluid pressure source P_H creating an unbalanced axial force on said piston causing said piston to be axially displaced between a first position where said first face is in contact with said seating member during nonrotation of said shaft and a second position where said first face is in contact with said sealed fluid during shaft rotation.

4,076,260

SEALING DEVICE FOR ROTARY MACHINES CONTAINING HYDRAULIC FLUID

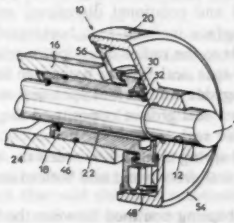
Auguste Legoy, and Claude Legoy, both of 12 bis rue Rene Coty, Montivilliers, France 76290

Filed Feb. 3, 1977, Ser. No. 765,285

Claims priority, application France, Feb. 4, 1976, 76 03127

Int. Cl.² F16K *41/00*; F16J *15/42*

U.S. Cl. 277—25 **8 Claims**



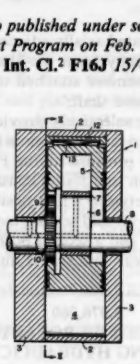
1. Sealing device for a rotary machine containing hydraulic fluid of the type comprising a casing, a shaft leaving said casing at at least one point of the latter and an annular gasket/valve (**24**) provided with a flexible lip, whereof one side is turned towards the suction side of the pump and which presses normally with sealed contact around the shaft when the pump is inoperative, characterised in that it comprises an annular sealing chamber (**30**) defined between the shaft **14** and a casing

part, said sealing chamber being connected, on the one hand, to the side of the gasket lip opposite the first said side and, on the other hand, to an annular cavity (52) defined inside a hollow rotary body (20) fixed in a sealed manner around the end of the shaft to be sealed and fitting with clearance around the casing, valve means (44) being provided for connecting the delivery side (40) of the pump to said sealing chamber (30) when the pump rotates at normal speed in order that said sealing chamber is permanently filled with liquid at a pressure equal to that of the delivery pressure, such that the gasket/valve (24) is separated from the shaft and that a leakage flow is delivered to said cavity (52) of the rotary body (20) where it forms a liquid ring (70) pressed under the effect of the centrifugal force against the outer periphery of said cavity, recovery means (48) being provided for keeping the depth of said liquid ring constant and for restoring the excess liquid to said sealing chamber as well as for maintaining said sealing chamber at a pressure greater than that of the suction pressure of the pump.

4,076,261
APEX SEAL DEVICE FOR USE IN ROTARY PISTON ENGINE

Yasumi Ooba, Toyota, Japan, Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 16, 1974, Ser. No. 515,216
Claims priority, application Japan, Mar. 28, 1974, 49-35734[U]
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.[2] F16J *15/48*
U.S. Cl. 277—81 P **2 Claims**



1. In a rotary piston engine of the type comprising a rotor, an apex seal groove provided in a crest portion of said rotor, a rotor housing, and an apex seal device, the improvement comprising:

an apex seal movably located within said apex seal groove in the radial and rotational directions, said seal having a bottom surface inclined to a horizontal plane making a right angle to the radius direction in relation to said apex seal, said apex seal further having an interstice between the leading side wall of said apex seal and the inside wall of said apex seal groove opposite to the leading side wall of said apex seal; and

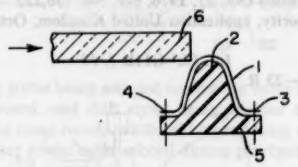
an apex seal spring confined between the bottom surface of said apex seal groove and said bottom surface of said apex seal.

an apex seal spring confined between the bottom surface of said apex seal groove and said bottom surface of said apex seal, said spring contacting said inclined bottom surface of said apex seal, at only a point nearer the trailing side wall of said apex seal than the leading side wall of said apex seal whereby the trailing side wall of said apex seal is not only urged against the inside wall of said apex seal groove opposite to the trailing side wall of said apex seal but also inclined against the direction of rotation of the rotor thereby preventing blow-through of combustion gas from a combustion chamber to a suction chamber.

4,076,262
SLIDING SEAL

Gert Deventer, Munich, Germany, assignor to Deventer KG, Germany

Filed Nov. 24, 1975, Ser. No. 634,784
Claims priority, application Germany, Sep. 20, 1975, 2541992
Int. Cl.[2] B65D *53/00;* **F02F** *11/00;* **F16J** *15/00;* **F16K** *41/00*
U.S. Cl. 277—227 **33 Claims**



1. A sliding seal comprising:

base member means,

a layer of material having a relatively low coefficient of friction,

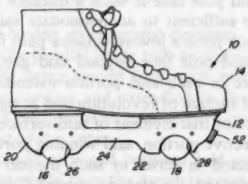
support member means carried by said base member means and disposed for supporting said layer at least within a sliding zone of the seal, said layer being fixedly adhered to said base member means in a shear resistant manner only at positions spaced from said sliding zone, whereby said support member means and said layer are movable with respect to one another in said sliding zone,

and connection means for connecting said layer to said base member means in a shear resistant manner at respective opposite sides of said support member means at positions spaced from said sliding zone, said layer covering said support member means at least in the area of said sliding zone when connected by said connection means.

4,076,263
BALL SKATE

Robert K. Rand, 929 Falls Church Road, Matthews, N.C. 28105

Continuation-in-part of Ser. No. 565,144, Apr. 4, 1975, abandoned. This application Nov. 20, 1975, Ser. No. 633,639
Int. Cl.[2] A63C *17/24*
U.S. Cl. 280—11.1 BR **10 Claims**



1. A skate, comprising:

(a) a frame,

(b) means for attaching said frame to the foot of a person,

(c) said frame defining at least a pair of downwardly open sockets,

(d) a ball mounted for rotation in each of said sockets,

(e) at least a pair of shafts mounted in spaced relation to said frame proximate to each socket and extending in a horizontal transverse direction with respect to the length of said frame,

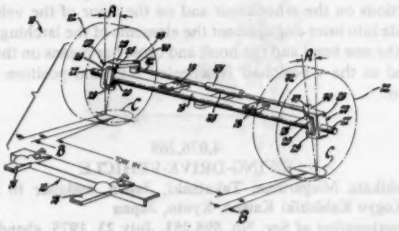
(f) a plurality of rings mounted for free independent rotation to at least one of said shafts and at least one ring mounted for rotation to another of said shafts, the periphery of each of said rings rotatably supporting said ball at the outer surface thereof.

4,076,264

SELF STEERING TRAILER ARRANGEMENT

James P. Chatterley, Washington, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 15, 1976, Ser. No. 732,926
Int. Cl.[2] B60D *1/06;* B62D *13/06*
U.S. Cl. 280—81 A 9 Claims



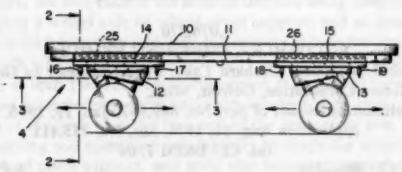
1. For use with a motor vehicle, a self steering trailer comprising frame means, hitch means operatively connected to the forward end of said frame means for securing said trailer to said motor vehicle so as to be pivotable relative thereto in the vertical direction only, an axle, a trailer body mounted on said axle and secured to said frame means, a pair of oppositely disposed wheel carriers pivotally connected to the respective ends of said axle, a road wheel rotatably mounted on each of said wheel carriers such that the pivot axis of said wheel carrier intersects the road surface a predetermined distance outboard of the centerline of said road wheel, and adjustable link means pivotally connected between said wheel carriers, said adjustable link means including aligned tie bars pivotally connected at the outer ends thereof to said respective wheel carriers, and damper means operatively interconnecting the inner ends of said tie bars for responding to road load conditions upon the reversing of direction of travel to accommodate pivoting of said wheels about said pivot axis such that said wheels automatically toe-in in the new direction of movement of said motor vehicle.

4,076,265

SKATEBOARD WITH LONGITUDINALLY ADJUSTABLE WHEELS

John William Eash, II, 232 Melrose St., Oxnard, Calif. 93030

Filed Jun. 24, 1976, Ser. No. 699,371
Int. Cl.[2] B62B *11/00;* A63C *1/26*
U.S. Cl. 280—87.04 A 5 Claims



1. A skateboard with longitudinally adjustable wheels including, in combination:

a. a footboard having elongated track means running along its underside;

b. front and rear wheel trucks;

c. front and rear guiding and locking means for said front and rear wheel trucks, respectively, for securing said front and rear wheel trucks to adjacent portions of said track means in selected longitudinal positions, each of said guiding and locking means including:

1. slide plate means on said associated truck means having a top surface engaging the under surface of the adjacent portion of said track means, said adjacent portion of said track means being in the form of a central channel having inwardly opposed flanges to define a T groove running longitudinally along the underside of said footboard, said slide plate means including longitudinally spaced openings;

2. slide bar means of rectangular cross section received in said channel defining the cross portion of said T groove and including longitudinally spaced threaded bores exposed between the opposing flanges defining the stem portion of said T groove; and,

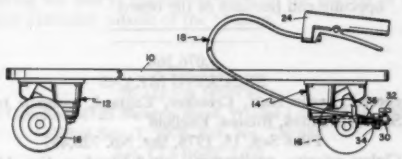
3. threaded bolt means having heads of larger diameter than said openings and shank portions individually receivable through said longitudinally spaced openings in said slide plate means and in said stem portion of said T groove to be threaded in said longitudinally spaced threaded bores, whereby said trucks may be longitudinally positioned along said track means at a desired spacing from each other and the front and rear ends of said footboard, said slide bar means serving as guides for such longitudinal positioning, and whereby said trucks may be secured in their set positions by tightening of said threaded bolt means to draw said slide bar means against the underside of said inwardly opposed flanges and thereby sandwich and grip said flanges between said slide bar means and the top surfaces of said slide plate means.

4,076,266

BRAKE ASSEMBLY FOR SKATEBOARD

Howard I. Krausz, 513 12th St., Galveston, Tex. 77550

Filed Jun. 14, 1976, Ser. No. 695,740
Int. Cl.[2] A63C *17/14*
U.S. Cl. 280—87.04 A 3 Claims



1. A skateboard assembly having a combination tether and hand brake comrpising:

(a) a deck portion having a cleared upper surface to provide a platform for the unfettered feet of the user, said deck portion also having an undercarriage sturcture;

(b) a plurality of truck means and support wheels journalled on said truck means in said undercarriage structure beneath said deck permitting steering said skateboard assembly completely by the use of the feet;

(c) a frictional member and means mounting same on said skateboard assembly beneath said deck and being movable such that said frictional member can move from a first position clear of said wheels to a second position frictionally engaging at least one of said wheels to brake same;

(d) a flexible Bowden wire cable having an outer sheath and an inner core, and doubling as a brake line and a tether, one end of said cable being mounted to said skateboard assembly such that said sheath is substantially immobile relative thereto and said core is connected to said frictional member such that axial motion of said core moves said frictional member between said first and second positions;

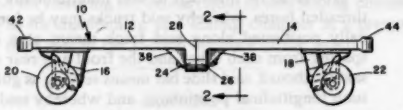
(e) a hand grip means mounted on the other end of said cable, said hand grip means being operable to displace said core axially relative to said sheath when said hand grip means is squeezed to brake said skateboard assembly, said cable representing the only connection between the rider and said skateboard save standing contact on said platform, whereby the operator of said skateboard may ride

same with his feet and body completely unhindered, and upon engaging said hand grip in the hand have said skateboard assembly securely retained on the end of said cable and prevented from escaping and have complete braking control over said skateboard assembly as well.

4,076,267
ARTICULATED SKATEBOARD

Willis Leonard Lipscomb, 2208 Willow St., San Diego, Calif. 92106

Filed Sep. 20, 1976, Ser. No. 724,660
Int. Cl.[2] A63C *17/00*
U.S. Cl. 280—87.04 A **4 Claims**

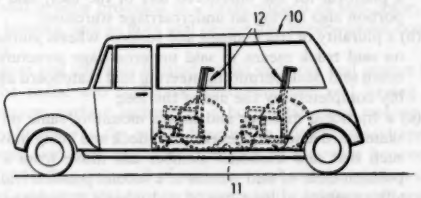


1. An articulated skateboard, comprising:
an elongated, substantially planar board having a rider supporting upper surface, the board being transversely divided into a front section and a rear section;
said front and rear sections having downwardly extending confronting end walls having a common contact face, the end walls extending the full width of the board and having edges curving smoothly downwardly from both sides of the board;
a pivot pin extending through said end walls on a longitudinal axis and pivotally interconnecting said front and rear sections;
and surface travelling supporting means mounted under opposite end portions of the board.

4,076,268
SECURING MEANS

Frederick Leslie Hart, Cressage, England, assignor to GKN Sankey Limited, Bilston, England

Filed Sep. 15, 1976, Ser. No. 723,497
Claims priority, application United Kingdom, Sep. 16, 1975, 37954/75
Int. Cl.[2] B60P *7/00*
U.S. Cl. 280—179 R **14 Claims**

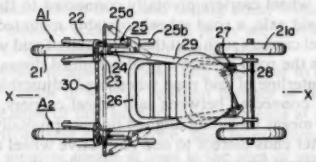


1. In the combination of an invalid's wheelchair and a vehicle for conveying said wheelchair, means for releasably securing the chair in a predetermined position on the floor of the vehicle, said securing means comprising: hook means having spaced, substantially horizontal upper and lower limbs and cross bar means; one of said means fastened to the floor of the vehicle and the other means fastened to the wheelchair adjacent one end thereof; the cross bar means fitting closely between said limbs when the wheelchair is in said position to prevent substantial vertical relative movement between the wheelchair and the floor; first complementary locating elements on the hook means and the cross bar means to prevent substantial lateral movement of the cross bar means relative to the hook means when engaged therewith; complementary latching elements on the floor and on the wheelchair to prevent, when latched with the wheelchair in said position, disengagement of the hook means and the cross bar means; second complementary locating elements, one of said elements located on the floor of the vehicle and the other element located on the wheelchair adjacent the other end thereof to prevent substantial relative vertical movement between the floor of the vehicle and the wheelchair when the latter is in said position; and guide portions on the wheelchair and on the floor of the vehicle to guide into inter-engagement the elements of the latching means on the one hand and the hook and cross bar means on the other hand as the wheelchair is wheeled into said position on the floor.

4,076,269
SWING-DRIVE-VEHICLE

Yoshikata Muguruma, Takatsuki, Japan, assignor to Shinpo Kogyo Kabishiki Kaisha, Kyoto, Japan

Continuation of Ser. No. 598,251, July 23, 1975, abandoned. This application Aug. 10, 1976, Ser. No. 713,197
Claims priority, application Japan, Aug. 7, 1974, 49-90630; Feb. 5, 1975, 50-15111; Feb. 5, 1975, 50-15112
Int. Cl.[2] B62M *1/16*
U.S. Cl. 280—218 **5 Claims**



1. A swing drive vehicle comprising a frame member, at least one ground contacting member mounted on said frame member, two assemblies disposed symmetrically and laterally of said frame member, each assembly comprising a steering column means, a handle member secured to the top of the steering column means, a rod member secured to said steering column means and pivotally mounted at the other end to said frame member with respect thereto, a fork member mounted at the lower end of said steering column means, and a ground contacting element mounted on said fork member, whereby said assemblies may be moved synchronously in diverging and converging directions by said handle members with respect to said frame member so as to impart a motion to the vehicle.

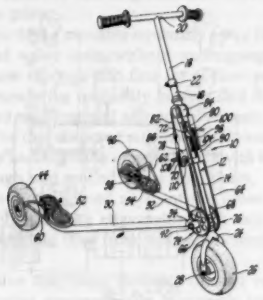
4,076,270
FOLDABLE CAMBERING VEHICLE

Frank J. Winchell, Orchard Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 649,967, Jan. 19, 1976. This application Aug. 11, 1976, Ser. No. 713,411
Int. Cl.[2] B62M *1/04*
U.S. Cl. 280—220 **6 Claims**

6. A cambering vehicle comprising an upright frame provided with a pair of trailing arms having forward ends thereof pivotally connected to opposite sides of the frame for rotation about substantially transverse axes, a mechanical cambering device interconnecting the trailing arms for movement in equal and opposite directions through substantially equal angles about their axes when the vehicle is leaned into a turn, a selectively operable locking device effective to lock the trailing arms at will to maintain fixed relative positions of the trailing arms about their axes, and means operatively associated with said locking device and constructed to permit the frame and the trailing arms selectively, to be folded at will towards each other about the said axes and to be locked in a collapsed posi-

tion in which the frame and the trailing arms are positioned adjacent each other and extend in generally the same diection



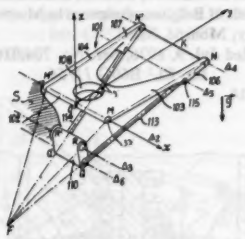
so as to provide a compact rigid package that can be stowed in a minimum of space.

4,076,271

VEHICLE WHEEL SUSPENSION DEVICE

Pierre M. Doncque, Amiens, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly, France

Filed Mar. 30, 1976, Ser. No. 671,947
Claims priority, application France, Apr. 3, 1975, 75 10462
Int. Cl.[2] B60G *15/00*
U.S. Cl. 280—284 **9 Claims**



1. A motorcycle rear wheel suspension device which is resistant to distortion comprising two arms constituting a fork having an articulated base, which fork oscillates relative to the body of the motorcycle about an oscillation axis at the base of the fork, the free ends of the arms of the fork being adapted for carrying a wheel axle or wheel pivot support; and an intermediate solid lower than said fork and serving as base for connecting rods which converge substantially into proximity with this solid; at least two rods being connected at separated locations to said intermediate solid and each connected to one of the arms of the fork near the free end of the respective arm, each connecting rod extending substantially towards the wheel axle or wheel pivot support, said solid also being connected to the base of the fork.

4,076,272

RETRACTABLE CONDUIT SYSTEM

Michael O. Penton, Antioch, Calif., assignor to Penton Hose Protection Systems, Inc., San Diego, Calif.

Continuation of Ser. No. 589,166, Jun. 23, 1975, abandoned.
This application Nov. 16, 1976, Ser. No. 742,318
Int. Cl.[2] B60D *1/08*
U.S. Cl. 280—421 **5 Claims**

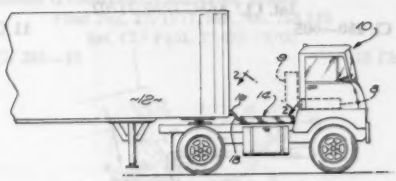
1. In combination, apparatus for protecting the unextended portion of a retractable flexible hose and for maintaining the extended portion of the hose under tension, comprising:

a tractor vehicle and a trailer vehicle pivotally coupled in tandem;

a rigid elongated housing mounted on one of said vehicles;

an aperture formed in one end of said housing;

a flexible hose having the ends thereof connected to said vehicles and having an extensible portion contained within said housing, said extensible portion in a retracted position comprising a loop arranged longitudinally of said housing and being fixed to a portion of said housing adjacent said one end with said extensible portion in an extended position thereof extending outside of said housing through said aperture, said extensible portion being of



sufficient length to permit extension of the hose from the housing at least the maximum distance as required for pivotal relative movement of said tractor and trailer vehicles as in turning and maneuvering during use; and,

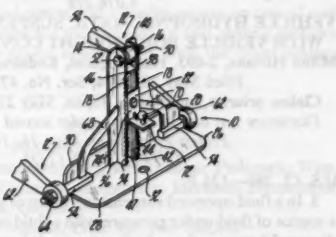
a linear acting coil spring having an anti-frictional sliding connector directly engaging said flexible hose at one end of the coil spring, the other end of the coil spring being fixed to an end of said housing remote from said aperture, said spring being capable of resiliently retracting said extensible portion of said flexible hose into said housing in proportion to variations in said extension of the hose during use and to maintain tension on the portion of the hose extended outside of the housing.

4,076,273

TRAILER HITCH

Ernest Campion, 4125 Newton Road, Walled Lake, Mich. 48085

Filed Sep. 7, 1976, Ser. No. 720,688
Int. Cl.[2] B60P *3/06*
U.S. Cl. 280—490 R **13 Claims**



1. A hitch comprising:

a. a drawbar,

b. a pair of vertically extending spaced apart, parallel channel forming members, the members being mounted on the drawbar, each member having one edge thereof provided with a plurality of regularly spaced, aligned serrations along the vertical extent thereof, each one serration on one edge of one member being in registry with one serration on one edge of the other member,

c. a ball for attaching a towing implement thereto,

d. a tongue having the ball mounted thereonto, the tongue having a portion thereof provided with regularly spaced, aligned serrations which are complementary to and which nest in the serrations formed on the channel forming members,

e. means for securing the tongue in a fixed position to the channel forming members, and

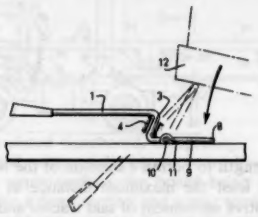
wherein the ball is incrementally vertically adjustable by nesting the tongue serrations in selected channel forming serrations and the tongue securing means urges the serrations of the tongue into nesting relationship with the serrations of the channel forming members.

4,076,274

SKI BRAKES

Georges Pierre Joseph Salomon, Annecy, France, assignor to Societe Anonyme des Etablissements Francois Salomon & Fils, Annecy, France

Filed Apr. 26, 1976, Ser. No. 680,514
Int. Cl.[2] A63C 7/10, 11/02
U.S. Cl. 280—605 **11 Claims**



1. In a brake mounted on a ski having a longitudinal axis, opposite longitudinal edges, and upper and lower surfaces, the brake comprising a spade lying along and above a longitudinal edge of the ski, a pivot portion connected to said spade and a pedal portion extending from the pivot portion; the pedal being adapted for engagement by a ski boot to move the spade about its pivot portion from an active position, projecting below the ski, to an inactive, retracted position above the ski, the improvement wherein said pivot portion is bent at an angle with respect to said spade, and bearing means is provided for mounting said pivot portion to rotate about an axis inclined downwardly toward the inside at an acute angle with respect to a horizontal plane through the ski, at an acute angle with respect to a transverse vertical plane through the ski and at an acute angle with respect to a longitudinal vertical plane through the ski.

4,076,275

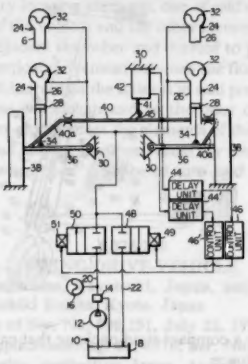
VEHICLE HYDROPNEUMATIC SUSPENSION SYSTEM WITH VEHICLE BODY HEIGHT CONTROL MEANS

Mituo Hiruma, 2-693, Hanakoganei, Kodaira, Tokyo, Japan

Filed May 20, 1974, Ser. No. 471,706
Claims priority, application Japan, May 21, 1973, 48-55521
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.[2] B60G 11/28
U.S. Cl. 280—124 F **9 Claims**

1. In a fluid operated suspension system of a vehicle including a source of fluid under pressure with a fluid reservoir, adjustors disposed between the vehicle wheel axles and the body of said vehicle, valves operative to communicate the adjustors with the source and the reservoir to raise and lower the vehicle body respectively relative to a road surface and a stabilizer bar connected to at least two of the adjustors, the improvement comprising:

sensing means disposed between the vehicle body and the stabilizer bar in such a manner that a first portion of the sensing means is mounted on the vehicle body and a second portion thereof mounted on the stabilizer bar, sensing an angular orientation of the stabilizer bar relative to a longitudinal axis of the vehicle body and operative to produce an electrical signal when said angular orientation is outside a predetermined range indicating that a vehicle height above the road surface is outside a predetermined range, the first portion being adjustably mounted and substantially perpendicularly adjustable through a lever system operable by a vehicle occupant from within the vehicle in a direction along said longitudinal axis for allowing selection of the predetermined range of the vehicle height above the road surface; and



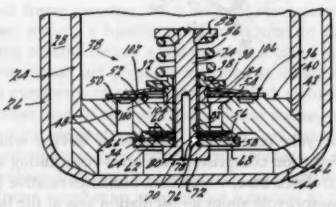
control means responsive to said electrical signal operative to actuate the valves to communicate the adjustors with one of the source and the reservoir to restore the height of the vehicle body above the road surface to within said predetermined range.

4,076,276

BASE VALVE FOR INDEPENDENT WHEEL SUSPENSION STRUT

Jan M. A. Wijnhoven, Sint-Truiden; Alexandru Oancea, Zepperen; Henri C. J. Vanhove, Gelmen, and Roland H. C. Beets, Sint-Truiden, all of Belgium, assignors to Monroe Auto Equipment Company, Monroe, Mich.

Filed Jul. 9, 1976, Ser. No. 704,016
Int. Cl.[2] B60G 11/56
U.S. Cl. 280—714 **18 Claims**



1. A base valve assembly for a shock absorber having a pressure cylinder, a piston movable within said cylinder, a reservoir tube extending around said pressure cylinder and defining a fluid reservoir therewith,

said valve assembly being located adjacent the lower end of said pressure cylinder and controlling fluid flow between said reservoir and the interior of said cylinder,

said assembly including a valve body having a central axially extending opening and first and second pluralities of radially spaced, axially extending flow ports,

first and second axially extending concentric valve seats on the upper side of said valve body,

said valve seats being located radially opposite sides of the upper ends of said first set of flow ports,

an axially extending third valve seat on the lower side of said valve body,

said third valve seat being located radially outwardly from the lower ends of said second set of flow ports and partially defining a valve chamber adjacent the lower side of said valve body,

a valve pin extending axially through said opening and projecting above the upper side of said valve body,

a floating valve disc disposed adjacent the upper end of said valve body and being engageable with said first and second valve seats for blocking fluid flow through said first set of flow ports,

said valve disc being movable upwardly away from said first and second valve seats without undergoing bending to provide flow through said first set of flow ports,

first spring means for resiliently biasing said floating valve disc toward said first and second valve seats,

a second valve disc disposed adjacent the lower end of said valve body and normally engaged therewith to block fluid flow through said second set of flow ports,

a third valve disc disposed adjacent the lower end of said valve body and being engageable with said third valve seat to block fluid flow from said valve chamber into said reservoir,

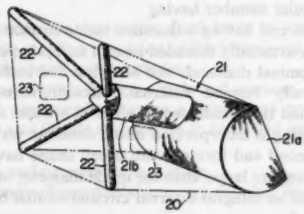
said third valve disc being mounted on said valve pin and being movable concomitantly therewith axially of said valve body to open and close a flow path between said reservoir and said chamber, and

a helical coil spring extending coaxially around the upper end of said valve pin and resiliently urging said pin and said third valve disc carried thereon toward said position wherein said third valve disc closes said flow path.

4,076,277
GAS COLUMN TYPE AIR BAG SYSTEM

Satosi Kuwakado, Nishio; Takao Kasagi, Tokai, and Toshihiro Takei, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio and Arakawa Autobody Co., Ltd., Toyota, both of, Japan

Filed Dec. 3, 1975, Ser. No. 637,184
Claims priority, application Japan, Dec. 9, 1974, 49-141925
Int. Cl.[2] B60R *21/08*
U.S. Cl. 280—738 **3 Claims**



1. A gas column air bag system for restraining an occupant in a vehicle having a compartment, upon collision of the vehicle compartment, comprising:

a gas source for supplying a high pressure gas in case of said collision;

inflatable bag means adapted for being mounted in said compartment said bag means having a bag wall;

means defining a first gas column provided inside said inflatable bag means for expansion by the high pressure gas from said gas source and adapted to be mounted in said compartment said first gas column being expansible to a relatively large volume and effective to restrain when expanded, the knees of the occupant;

means defining a second gas column of relatively large diameter extending from a substantially axially central portion of said first gas column and having an outer end, said second gas column being expansible within said inflatable bag means toward the occupant concurrently with said first gas column; and

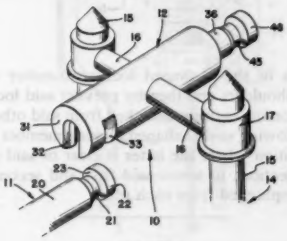
four third gas columns extending from the outer end of said second gas column in four diverging directions and having diameters smaller than the diameter of said second gas column, each said third gas column having an outer end jointed in each corner portion of the bag wall and being expansible concurrently with said first and second gas columns; and

means for drawing air in said compartment of the vehicle into the interior of said bag means when said bag is expanded by said columns, thereby enabling said bag means to restrain the torso of the occupant.

4,076,278
LATERALLY ENGAGEABLE FLOWLINE CONNECTOR DEVICE

Georges M. Chateau, Pau, France, and Praful Desai, Huntington Beach, Calif., assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Jan. 27, 1977, Ser. No. 763,110
Int. Cl.[2] F16L *35/00, 55/00*
U.S. Cl. 285—18 **10 Claims**



1. In a flowline connector device for a flowline wherein a connector means is laterally engaged and a seal is provided between axially related connector means, the combination of:

a first connector means adapted to be secured to the end of the flowline, said connector means having a sealing surface;

a second connector means adapted to be secured to a subsea installation, said second connector means having a sealing surface;

means on said connector means for interengagement of said connector means by movement of one connector means in a lateral direction to bring said sealing surfaces into juxtaposition and said connector means into axial alignment;

and fluid actuated piston and cylinder means on one of said connector means for moving one of said sealing surfaces into pressure sealed engagement with the other sealing surface.

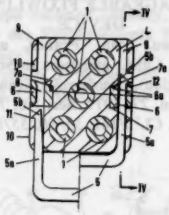
4,076,279
PLUG-IN COUPLING

Heinz Klotz, Dortmund-Syburg, and Dietmar Podszuck, Wuppertal, both of Germany, assignors to Hermann Hemscheidt Maschinenfabrik, Germany

Filed Sep. 23, 1976, Ser. No. 725,942
Claims priority, application Germany, Sep. 23, 1975, 2542284
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—26 **4 Claims**

1. A multiple-passage plug-in coupling for releasably connecting hose or pipe ends, the coupling comprising: a first coupling part, longitudinally-extending parallel nipples on that part, a second coupling part, longitudinally extending parallel sleeves in the second coupling part to receive the said nipples when the said two coupling parts are plugged together by a simple, axial, non-rotary movement, two guide projections disposed non-centrally on one of said coupling parts, two corresponding guide recesses to receive the said two projections disposed non-centrally and at opposite locations in the other one of said coupling parts, channels in the said projections, further channels in the said other coupling part, said channels in the guide projections being in alignment with said channels in the said other coupling part when said first and

second coupling parts are plugged in together, a U-shaped locking member slidably disposed in said channels of said other coupling part and being slidable into and beyond said channels in the said two projections whereby to lock said first and second coupling parts together, shoulders forming interruptions in said channels of said other coupling part adjacent said two guide recesses, and outwardly-directed latch surfaces at



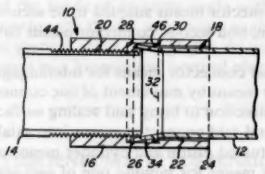
the free ends of the U-shaped locking member adapted to engage said shoulders and thereby prevent said locking member from becoming entirely detached from said other coupling part while allowing said U-shaped locking member to be movable to a position where the latter is clear of said channels in the said projections to allow said first and second coupling parts to be unplugged from each other.

4,076,280

CONDUIT COUPLING

James M. Young, Pittsburgh, Pa., assignor to Robroy Industries, Verona, Pa.

Filed Jun. 21, 1976, Ser. No. 698,222
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—39 **11 Claims**



1. A coupling for joining together the end portions of a pair of conduits comprising,

a cylindrical body portion,

said cylindrical body portion having a passageway extending therethrough, said passageway having an internally threaded end portion an intermediate annular recessed portion and a cylindrical end portion,

said intermediate annular recessed portion separating said threaded end portion from said cylindrical end portion,

said intermediate annular recessed portion forming a first shoulder adjacent said threaded end portion and a second shoulder adjacent said cylindrical end portion,

said second shoulder having a circumferential cutting edge portion projecting into said annular recessed portion,

said passageway cylindrical end portion arranged to receive an end portion of a first conduit having an outer diameter less than the internal diameter of said passageway cylindrical end portion, said first conduit end portion arranged to be expanded into said passageway intermediate annular recessed portion and axially spaced from said first shoulder to permit said cylindrical body portion to move axially on the first conduit for rotation of said cylindrical body portion relative to the first conduit, and

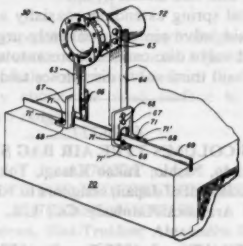
said passageway threaded end portion arranged to threadedly receive an externally threaded end portion of a second conduit in a manner that said externally threaded end portion extends into and underlaps the expanded end portion of said first conduit upon rotation of said cylindrical body portion to maintain said first conduit expanded end portion of said first conduit in abutting relation with said passageway intermediate annular recessed portion second shoulder to securely join together said pair of conduits in locking engagement with said coupling.

4,076,281

BELL FITTING AND SUPPORT ASSEMBLY FOR PIPE

Samuel H. Davis, 111 Forest Drive, Jericho, N.Y. 11753

Filed Apr. 13, 1976, Ser. No. 676,656
Int. Cl.[2] F16L *3/00*
U.S. Cl. 285—64 **8 Claims**



1. A bell fitting for iron pipe of a preselected standard nominal diameter and particularly adapted for use as a concrete wall penetration fitting, the bell fitting comprising:

an annular member having

a first end having a threaded inside surface adapted to fit an externally threaded pipe of said preselected standard nominal diameter, and said first end including an integrally formed external, circumferential continuous blind flange adapted to serve as a water stop when the fitting is incorporated into a concrete wall;

a second end formed with a bell shape having an inside diameter larger than the inside diameter of said first end and an integral external circumferential bolting flange; and

mounting means comprising at least two circumferentially spaced tabs integrally formed on and extending outwardly from the surface of the fitting adjacent said first end, said mounting means being adapted to permit support of the bell fitting at said first end independently of said bolting flange on said second end.

4,076,282

MOLDED PLASTIC ARTICLE

John N. Scott, Jr., Dallas, Tex., and Guy E. Carrow, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

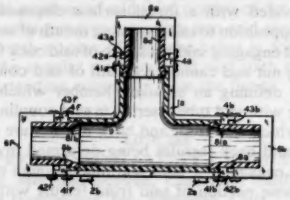
Division of Ser. No. 599,738, Jul. 28, 1975, Pat. No. 3,989,787. This application Jun. 25, 1976, Ser. No. 699,829
Int. Cl.[2] F16L *47/02*
U.S. Cl. 285—156 **3 Claims**

1. A thermoplastic article comprising

(a) a molded hollow body section of crosslinked thermoplastic resin material, and

(b) at least two pieces of pipe of a non-crosslinked thermoplastic resin material communicating with the interior of

said body section, wherein said body section has been rotationally molded from crosslinkable thermoplastic



material in contact with and around said one end of said pieces of pipe of non-crosslinked thermoplastic material.

4,076,283

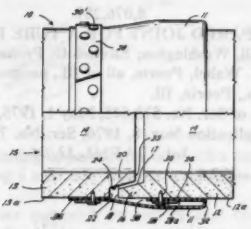
EXPANSION JOINT AND SEAL FOR SEWER PIPE

George W. Harrison, 2119 Sieber Drive, Houston, Tex. 77017

Filed Aug. 27, 1976, Ser. No. 718,419

Int. Cl.[2] F16L *49/00*

U.S. Cl. 285—230 **3 Claims**



1. An apparatus for preventing fluid leaks in joined pipe member and for enabling expansion of the joined pipe member while preventing such leaks, including:

a. a first pipe member having a male end portion;

b. a second pipe member having a female end portion for receiving said female end portion to form said joined pipe member;

c. a flexible sealing member including

i. a longitudinally expandable cover member having two ends,

ii. a circumferentially sealing mounted band member securing one end of the cover member around said pipe member adjacent the female end portion of said second pipe member such that the cover member extends longitudinally away from the male end portion of said first pipe member,

iii. a plurality of anchor members extending circumferentially around and through the female band member and one end of the cover member into said pipe member adjacent the female end portion,

iv. a circumferentially sealing mounted band member securing the other end of the cover member around said pipe member adjacent the male end portion of said first pipe member after looping the cover member over the female end band member and anchor member to form a looped portion of the cover member,

v. a plurality of anchor members extending circumferentially around and through the male end band member and the other end of the cover member into said pipe member adjacent the male end portion thereby permitting relative movement of the female and male ends until prevented from so doing by the one end of the cover member secured with the female end portion while preventing fluid leakage from between the female and male end portions in the joined pipe members.

4,076,284

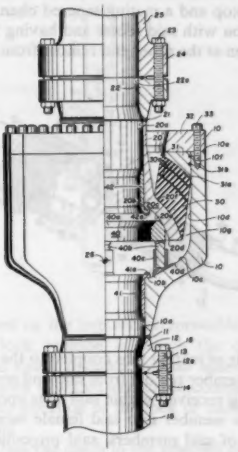
OCEAN FLOOR RISER CONNECTION

John T. Herbert; Frank J. Kovitch, both of Arlington, and Paul E. Sullivan, Euless, all of Tex., assignors to Murdock Machine & Engineering Co., Irving, Tex.

Filed May 5, 1976, Ser. No. 683,635

Int. Cl.[2] F16L *27/04*

U.S. Cl. 285—263 **11 Claims**



1. In a flexible riser connector for joining a surface casing to a riser wherein a housing means is connected to said surface casing and into which an annular means connected to said riser depend, the combination therewith which comprises:

(a) guide ring means mounted on at least three legs at a plurality of spaced points about an inner surface of said housing means and externally contoured to mate with an inner surface of said annular means for supporting said riser while accommodating scouring said housing means outside said ring means by flow of fluid between said legs;

(b) elastomeric means adhered to an outer surface of said annular means for providing a resilient seal;

(c) a collar adhered to the top surface of said elastomeric means and in sealed relation with the inner walls of said housing means; and

(d) retainer means secured to the upper end of said housing means for capturing said collar in said housing means.

4,076,285

LAMINAR FLOW CONNECTOR FOR CONDUITS

Felix Jesus Martinez, Demarest, N.J., assignor to Erika, Inc., Rockleigh, N.J.

Filed Aug. 1, 1975, Ser. No. 600,962

Int. Cl.[2] F16L *25/00*

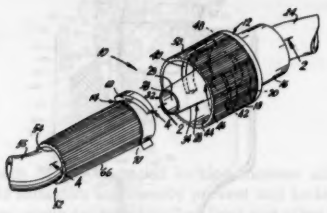
U.S. Cl. 285—332 **4 Claims**

1. A laminar flow connector for coupling first and second conduits to provide a hermetic seal therebetween, comprising:

a male member in the shape of a stepped cylinder having a reduced diameter portion and enlarged diameter portion separated by an annular wall, said reduced diameter portion being dimensioned to receive a first conduit therein with the end of the first conduit abutting against said annular wall, a truncated conical member centrally arranged within said enlarged diameter portion and coupled to said annular wall at its base, said member having an inner and an outer surface, said inner surface being in open communication with said reduced diameter portion and said outer surface having a continuous taper toward its apex, said first conduit and member inner surface being so constructed and arranged to provide laminar flow of a fluid therethrough, and a pair of projections on the inside

surface of said enlarged diameter portion, said projections extending radially inwardly therefrom and being spaced from said annular wall to form a pair of receiving slots; and

a female member in the shape of a cylinder having an end portion with a recess with an annular stop, said recess being dimensioned to receive a second conduit therein with the end of the second conduit abutting against the annular stop and a mating tapered channel in open communication with said recess and having its largest diameter portion at the other end remote from said end portion,



and a pair of mating tabs coupled to the other end of said female member remote from said end portion, said mating tabs being received within said slots upon full insertion of said male member into said female member and relative rotation of said members, said projections and said tabs coacting to provide a wedge-fit therebetween and a continuous hermetic seal between said truncated conical member and mating tapered channel and the apex end of said conical member is presented in smooth continuous flow relationship with the end of said second conduit, whereby a laminar flow path is created between the conduits through said truncated conical member.

4,076,286

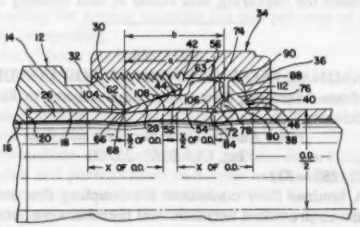
TUBE FITTING

Leonard P. Spontelli, Seven Hills,, Ohio, assignor to Crawford Fitting Co., Solon, Ohio

Continuation of Ser. No. 134,154, Apr. 15, 1971, abandoned. This application Feb. 8, 1973, Ser. No. 330,679

Int. Cl.[2] F16L *19/08*

U.S. Cl. 285—341 **12 Claims**



1. A tube joint comprising in combination:

a large diameter tube having an outside diameter O.D. and an inside diameter I.D., said outside diameter O.D. having a dimension greater than 1 inch;

a coupling body having a bore, a counterbore which receives said tube, and a rearwardly opening camming mouth which surrounds said tube with said tube inserted in said coupling body;

a front ferrule received upon said tube and having a nose portion, the rearward end of said front ferrule having a camming mouth;

a back ferrule received upon said tube adjacent said front ferrule and rearwardly thereof, said back ferrule having a nose portion and a back face;

a coupling nut threadedly engaged with said coupling body and provided with a thrust surface disposed in axially spaced opposition to said camming mouth of said coupling body and engaging said back face of said back ferrule, said coupling nut and camming mouth of said coupling body together defining an annular chamber which surrounds said tube with said tube inserted in said coupling body and within which said front and back ferrules are received;

said front and back ferrules being deformed inwardly into gripping engagement with said tube through engagement of said nose portion of said front ferrule with said camming mouth of said coupling body and said nose portion of said back ferrule with said camming mouth of said front ferrule, each of said ferrules forming a wave in said tube;

the relationship of said front ferrule to said tube being such that the axial length of said front ferrule is at least approximately ⅜ of O.D. of said tube and the ratio of the front ferrule length to the O.D./I.D. ratio of said tube is at least approximately 0.375 inches; whereby

the waves induced in said tube by said front ferrule is not encountered by said nose portion of said back ferrule.

4,076,287

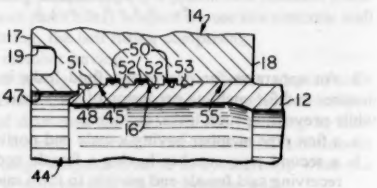
PREPARED JOINT FOR A TUBE FITTING

Roland F. Bill, Washington; Edward G. Prohaska, Aurora, and Bernard A. Wabel, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 573,648, May 1, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,880

Int. Cl.[2] F16L *13/04*

U.S. Cl. 285—382.4 **18 Claims**



1. A tube assembly, comprising:

a flange having an axis, first, second, third, fourth and fifth portions as consecutively measured along the axis from a first end of the flange, an annular opening extending therethrough and defining inner walls, a plurality of annular grooves, at least one annular land, and an annular rear land, said opening of said first portion being of a first preselected diameter, said opening of said second portion being of a second preselected diameter, said opening of said third portion being defined by annular grooves of a third preselected diameter spaced one from the other by said annular land which has a fourth preselected diameter, said annular rear land having a fifth preselected diameter, said opening of said fifth portion being of a sixth preselected diameter, said second, fourth and fifth preselected diameters being of a substantially uniform, common value, said sixth preselected diameter being of a substantially uniform value greater than said second, fourth, and fifth preselected diameters, and said third preselected diameters being of a substantially uniform, common value greater than said sixth preselected diameter;

a metal tube having first, second, third, fourth, fifth and sixth portions as consecutively measured from the first portion of the flange along the axis, said first, second, third, fourth and fifth tube portions extending into the flange opening, said first portion of the tube having an edge portion adjacent the first portion of the flange, said second and fifth portions of the tube being in forcible contact with inner

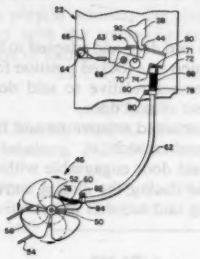
walls of the respective second and fifth portions of the flange, portions of said third portion of the tube adjacent the annular land being in forcible contact with said annular land, portions of said third portion of the tube adjacent the annular grooves extending into said annular grooves, said fourth portion of the tube being in forcible contact with the annular rear land, and said sixth portion of the tube extending outwardly from the flange.

4,076,288

ZERO SPEED SENSING SAFETY LATCH APPARATUS

Christopher Morrison Schwab, Cupertino, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 19, 1976, Ser. No. 678,019
Int. Cl.² E05C 3/14
U.S. Cl. 292—113 **9 Claims**



1. A safety latching apparatus for use with a cover enclosing a machine having a movable member, said apparatus comprising:

a latch member mounted on one of said cover and said machine and movable between a locked position and an unlocked position; and

an elongated control element having one end interacting with said latch member and the other end located adjacent said movable member, said control element having a single generally uniform elongated configuration between said one end and said other end, said control element movable between a first and a second engaging position with said movable member, said other end of said control element engaging said movable member, said other end being generally rigid when a force is exerted in substantially a longitudinal direction with said other end, said other end being deflective when a force is exerted in a generally transverse direction to the longitudinal direction of said other end, said movable member when stationary blocking longitudinal movement of said other end of said control element to said second position to allow said latch member to move to said unlocked position, said movable member when moving exerting a transverse force on said other end of said control element and deflecting said other end of said control element as said control element moves to said second position to prevent said latch member from moving to said unlocked position.

4,076,289

LOCK FOR A SLIDABLE DOOR

James Samuel Follows, and Gerhard Stanley Bergen, both of Surrey, Canada, assignors to Vanguard Plastics Ltd., Canada

Filed Sep. 22, 1976, Ser. No. 725,517
Int. Cl.² E05C 3/08
U.S. Cl. 292—226 **10 Claims**

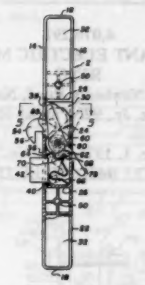
1. A lock for a slidable door comprising:

a elongated body having first and second side walls, a first end wall and a second end wall, the side walls and end walls defining a door-contacting base and a top, a catch compartment formed integrally in the elongated body by: (a) cross walls spaced from the end walls and joining the first and second side walls and (b) an upper wall adjacent the top of the elongate body, and a door handle for opening or closing the door;

a back plate to close the catch compartment;

a catch opening in a first side wall of the catch compartment;

a pivotable hub borne by aligned bearing means in the back plate and the catch compartment;



a catch mounted on the hub and reciprocable with the hub between a lock position in which the catch projects through said catch opening and an unlock position in which the catch is within said catch compartment;

means to permit selection of the lock or unlock position of the catch, and

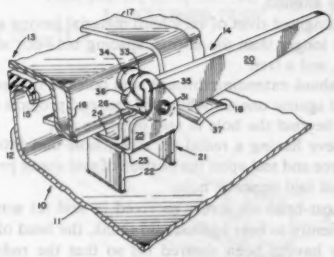
means to maintain the catch in the selected position.

4,076,290

HATCH COVER LOCKING MEANS

Theodore J. Sweger, Lake Worth, Fla., assignor to Illinois Railway Equipment Co., Chicago, Ill.

Filed Mar. 19, 1976, Ser. No. 668,465
Int. Cl.² E05C 3/04
U.S. Cl. 292—256.5 **2 Claims**



1. In lock means for locking down in its closed position over an upstanding hatchway in the roof of a hopper car a hatch cover that is hinged at one side of said hatchway, said lock means having, a lock strap mounted on said hatch cover and a press-down arm projecting laterally over said roof on the side of the hatchway opposite said hinged side of said hatch cover when the latter is in its closed position, an upstanding bifurcated support for an operating lever mounted on said roof adjacent one side of said press-down arm when said latch cover is closed, and an operating lever pivotally mounted between the sides of said bifurcated support in such manner that in the locked position the underside of said lever presses down on said press-down arm and the handle portion of said lever extends in spaced relationship over said roof, the improvement comprising, the upper end of said bifurcated support projecting above the pivot axis of said lever, a clevis pivotally mounted on said upper end of said bifurcated support, and the end of said lever opposite said handle end having

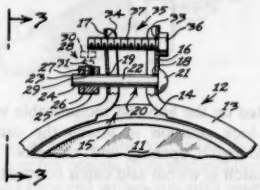
a hook formation thereon projecting through said clevis and engaging the bight thereof when said clevis is turned down and said lever is in the locked position, said lever being released from its locked position by pressing down on said handle thereof thereby simultaneously raising said hook formation sufficiently to allow said clevis to be turned up and thereby released from hooking engagement under said hook.

4,076,291

TAMPER-RESISTANT ELECTRIC METER SEALING RING

William M. Pope, 748 Newberry Road, Nashville, Tenn. 37205, and William M. Pope, Jr., 923 Parrish Road, Knoxville, Tenn. 37919

Filed Dec. 1, 1976, Ser. No. 746,315
Int. Cl.² B65D *45/32, 55/02*
U.S. Cl. 292—256.67 **3 Claims**



1. A tamper-resistant sealing ring assembly for an electric meter, comprising:

(a) a sealing ring member of a very hard material having a rim adapted to couple the cover of an electric meter to the socket for the meter,

(b) said sealing ring member having an opening in its rim defined by a pair of opposed, spaced, elongated ears projecting substantially radially outward from said rim,

(c) each ear having a uniform rivet hole extending therethrough adjacent said opening, said rivet holes being axially aligned,

(d) an elongated rivet of very hard material having a head, a shank longer than the normal spacing between said rivet holes, and a free

(e) said shank extending through said holes so that said head is held against one ear while said free end projects substantially beyond the hole in said opposite ear,

(f) a sleeve having a radial set screw hole and fitting over said free end and upon the portion of said shank projecting beyond said opposite hole,

(g) a shear-head set screw received in said set screw hole sufficiently to bear against said shank, the head of said set screw having been sheared off so that the radial outer portion of said set screw is substantially flush with said sleeve to hold said rivet in the holes of said ears, and

(h) said sleeve being fixed upon said shank close enough to the adjacent ear, and said rivet in said rivet holes being close enough to said opening, that said sealing ring member cannot be deformed sufficiently to be removed from said electric meter.

4,076,292

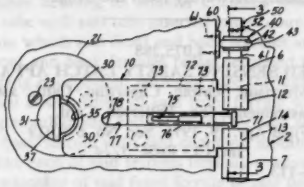
KEY ACTUATED AUXILIARY DOOR LOCK

Brooks Walker, 1280 Columbus Ave., San Francisco, Calif. 94133

Continuation-in-part of Ser. No. 563,570, Mar. 31, 1975, Pat. No. 3,971,238, Ser. No. 523,199, Nov. 13, 1974, Pat. No. 3,971,582, and Ser. No. 530,686, Dec. 9, 1974, Pat. No. 3,980,330. This application Oct. 16, 1975, Ser. No. 622,963
Int. Cl.² E05C *17/04*
U.S. Cl. 292—262 **2 Claims**

1. In a door structure that includes a frame, and a door having a hinge edge and an opposite latch edge, a safety lock for holding said door against opening comprising:

an elongated door holding member swingably supported on said frame adjacent said latch edge of the door and adapted to be swung from an inoperative position adjacent said frame to an operative position alongside the inner face of said door,



a catch mounted on said door and adapted to be moved from an unlocked position to a locked position for holding said door holding member relative to said door to prevent opening movement of said door,

a wheel rotatably mounted relative to said frame and connected to said member, and

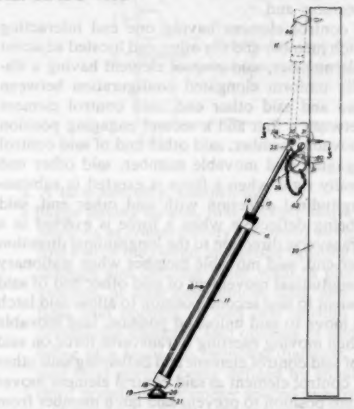
driving means on said door engageable with said wheel for rotating the latter during the closing movement of said door for swinging said member to operative position.

4,076,293

DOOR SECURITY STRUT

Joel Valles, 3601 W. 119th St., Alsip, Ill. 60658

Continuation of Ser. No. 479,649, Jun. 17, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,219
Int. Cl.² E05C *17/50*
U.S. Cl. 292—338 **1 Claim**



1. A door security strut comprising an elongated member having first and second opposite sides that are substantially straight and parallel, said member including a plate rigid with the member and extending radially from said first side, a bracket having a mounting portion adapted to be attached to a door for mounting the bracket in a fixed position on the door, said bracket having a pair of parallel side portions projecting outwardly from said mounting portion, means for attaching the member to the side portions in a first fixed non-yielding angular position relative to the bracket with the member extending downwardly and outwardly of the bracket, said attaching means including a first pivotal connection between an end of the member and said side portions, and a second connection between said plate and bracket, said second connection being spaced downwardly from said pivotal connection and compris-

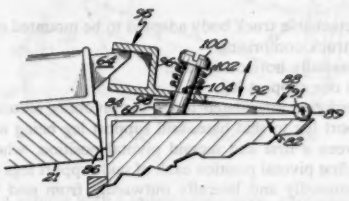
ing openings through said plate and said side portions and a locking pin insertable with a close fit through said openings to fix the plate in relation to the bracket, the member having means thereon adapted to engage a floor when the member is in said fixed angular position, said side portions being spaced apart to receive the member therebetween and to also receive the plate therebetween when the member is in said non-yielding position, said side portions being connected by a transverse portion, said plate extending toward the mounting portion in said non-yielding position of said member, said transverse portion being at the upper end of the side portions and spaced from said first pivotal connection in a direction toward said mounting portion to thereby permit the member to be swung about said first pivotal connection from said first non-yielding position to an upward substantially vertical storage position in which the plate extends in a direction away from said bracket and said second side of the member is outwardly spaced from the transverse portion whereby the plate and the member are out of contact with the transverse portion in said upward storage position of said member.

4,076,294

IMPACT ABSORBING LOCK APPARATUS

Bradley C. Holmberg, 2628 30th Ave. South, Minneapolis, Minn. 55406

Filed Aug. 7, 1975, Ser. No. 602,827
Int. Cl.[2] E05C *21/00*
U.S. Cl. 292—340 **15 Claims**



1. An impact absorbing lock apparatus usable with the latch bolt of a swingable door and mountable on a door jamb to protect against an impulse force applied to the door to force open the door, comprising:

a mounting bracket attachable to the door jamb adjacent the latch bolt;

a keeper capable of retaining the latch bolt;

means mounting said keeper for movement relative to said mounting bracket, permitting said keeper to move along a path between a rest position closely adjacent said mounting bracket and a displaced position;

impact absorbing means resisting movement of said keeper from said rest position to said displaced position and urging said keeper from said displaced position to said rest position to thereby absorb impulse forces applied to the door and the keeper; and

said means mounting said keeper for movement including a first guide rod extending outwardly from and fixed relative to said mounting bracket, said keeper being slidably mounted on said guide rod.

4,076,295

PEDESTRIAN CONTACT GUARD

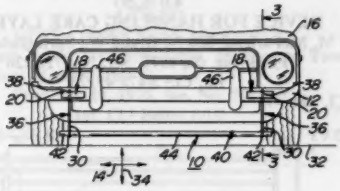
David Gutman, 503 Reed St., Philadelphia, Pa. 19147

Filed Apr. 8, 1976, Ser. No. 674,931
Int. Cl.[2] B60R *21/14*
U.S. Cl. 293—71 R **1 Claim**

1. A pedestrian contact guard adapted to be mounted to a transversely directed bumper comprising:

(a) bumper securing means rigidly secured to said bumper, said bumper securing means defining a pair of transversely displaced block members mounted to said bumper,

(b) vertical support means extending in a vertically downward direction, said vertical support means including a pair of transversely displaced vertically directed column members each releaseably secured to a respective one of said block members, each of said column members being securely fastened on a first end thereof to said bumper securing means; and,



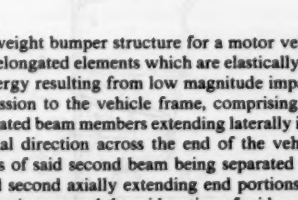
(c) pedestrian contact means being secured to each of said column members of said vertical support means on a second end thereof, said pedestrian contact means adapted in contour to extend forward of said bumper for initial contact of said pedestrian, said second end of said vertical support means passing through said pedestrian contact means and is secured thereto, said column members being deformably displaced when contacted with a force load in the approximate range of 50–100 pounds thereby minimizing injury to said pedestrian when impacted by said pedestrian contact means.

4,076,296

ENERGY ABSORBING BUMPER

Edwin D. Ditto, Bloomfield Hills, and A. Hadi Kobaisi Abu Akeel, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 19, 1976, Ser. No. 706,850
Int. Cl.[2] B60R *19/08*
U.S. Cl. 293—71 R **2 Claims**



1. A lightweight bumper structure for a motor vehicle having multiple elongated elements which are elastically deflected to absorb energy resulting from low magnitude impact before their transmission to the vehicle frame, comprising: first and second elongated beam members extending laterally in a generally horizontal direction across the end of the vehicle; both opposite ends of said second beam being separated into adjacent first and second axially extending end portions joined at an inward location toward the midportion of said second beam member to permit individual flexing of said portions out of the beam plane; mounting means between the vehicle frame and said first end portions; coupling means between said first beam member and said second end portion of the second beam member to normally space said beam members and yieldably mount said first beam member with respect to said second beam member by the allowed flexure between said first and second end

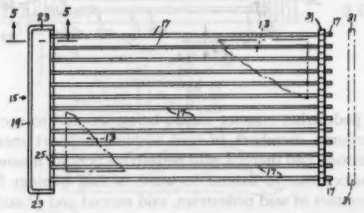
portions; said beams being of strong, lightweight material, such as fiberglass, which elastically deflects when subjected to relatively low magnitude impacts, thus absorbing energy in a retrievable manner so that after the impact, beam members return to their original configuration; said first beam member being arranged forward of said second beam member so as to simultaneously react by deflection to impact forces and then transmit a reaction force on said second beam member for further absorption of the impact forces.

4,076,297

DEVICE FOR HANDLING CAKE LAYERS

Paula M. McFarland, 534 N. Grand W., Springfield, Ill. 62702

Filed Aug. 20, 1976, Ser. No. 716,226
Int. Cl.[2] A47J *43/28*
U.S. Cl. 294—7 9 Claims



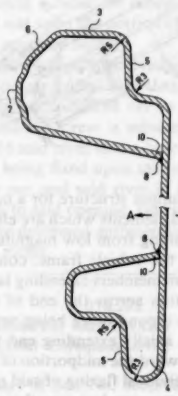
1. A device for handling cake layers or the like, comprising: a first handle, at least six parallel and coplanar tines rigidly and freely so held by said first handle, and a second removable handle bridging the free ends of said tines, said second handle having spaced sockets alignable with, and for quickly and easily receiving and releasing, said free ends.

4,076,298

VEHICLE SIDE WALL AND METHOD OF MAKING SAME

Lubomir Hanzelka; Josef Vidlar, and Ladislav Neuman, all of Koprivnice, Czechoslovakia, assignors to Tatra, narodni podnik, Koprivnice, Czechoslovakia

Division of Ser. No. 527,013, Nov. 25, 1974, abandoned. This application Jun. 2, 1976, Ser. No. 691,976
Claims priority, application Czechoslovakia, Nov. 23, 1973, 8095/73
Int. Cl.[2] B62D *27/00*
U.S. Cl. 296—28 R 3 Claims



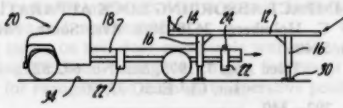
1. In a one-piece vehicle sidewall comprising a central elongated plate portion bent around at its respective opposite ends into unitary, substantially closed upper and lower strengthening borders having respectively, upwardly and downwardly facing broad surfaces, the upper border being provided in a first localized region of the broad surface thereof with a concave portion having a first predetermined radius and an adjacent convex portion having a second predetermined radius, the lower border being further provided in a second localized region of the broad surface thereof with a convex portion having said first radius and an adjacent concave portion having said second radius, the first and second localized regions being respectively located in complementary fashion on the respective upper and lower borders to permit longitudinal stacking of a plurality of the side walls with the broad surfaces of the upper and lower strengthening borders of the respective side walls in mating engagement with each other.

4,076,299

DETACHABLE TRUCK BODY

Thomas B. Dalton, Muskegon, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed Jun. 18, 1976, Ser. No. 697,485
Int. Cl.[2] B60P *1/64*
U.S. Cl. 296—35 A 22 Claims



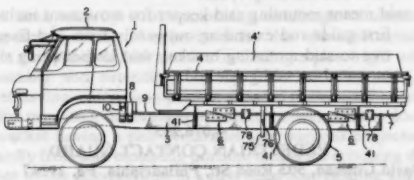
1. A detachable truck body adapted to be mounted onto the bed of a truck comprising:
a substantially horizontal base,
at least one support leg;
an interdigital articulated hinge for pivotally securing said support leg to said base, said support leg being movable between a first and second pivotal position, wherein in said first pivotal position each of said support legs extends downwardly and laterally outwardly from said base to engage a ground supporting surface to maintain said base in an elevated position, wherein in said second position each of said support legs are in a substantially horizontal position adjacent and underneath said base,
first means for locking each of said support legs in said first pivotal position, and
second means for locking each of said support legs in said second pivotal position.

4,076,300

MOTOR TRUCK

Akira Yamanaka, Yokohama, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 503,398, Sep. 5, 1974, abandoned. This application Jul. 28, 1976, Ser. No. 709,311
Int. Cl.[2] B62D *27/06*
U.S. Cl. 296—35 R 8 Claims



1. A motor truck comprising a frame device, a body device movable relative to the frame device, bolt members extending vertically at opposite sides of said frame and body devices to hold said device together, a die member being fitted on a stepped diameter portion at one respective end of each of the

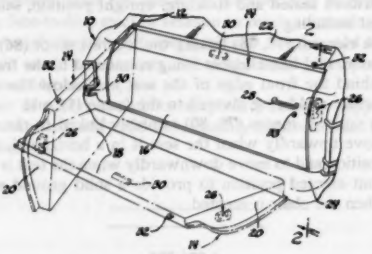
bolt members and having a periphery that is arcuate in section and in operative contact with one of said devices, and an energy transforming means including a first plate member fixed to one of said devices and having a first parabolic sliding surface and a second plate member fixed to the other of said devices and having a second parabolic sliding surface, which slidably contacts with at least a portion of said first sliding surface of said first member, said first sliding parabolic surface including a forwardly projecting, substantially horizontal, gradually descending leading portion in limited engagement with said second parabolic sliding surface; said body device being moved upwardly by said energy transforming means when a longitudinal impacting force of or greater than a predetermined value is applied, whereby said stepped diameter portion of the bolt member is pulled through the die to cause its deformation to absorb kinetic energy of the body device.

4,076,301

VEHICLE TAILGATE

Bela Gergoe, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 2, 1977, Ser. No. 764,867
Int. Cl.² B60J *5/00*
U.S. Cl. 296—50 **4 Claims**



1. In a vehicle with a tailgate-type door, alternately pivotal about a substantially vertical axis in a door mode of operation and about a substantially horizontal axis in a drop gate mode of operation, having door supports including a multi-axis hinge at one corner of the door, and first and second alternately releasable hinge-latches, one of each located at door corners adjacent to the multi-axis hinge, a main latch assembly for securing the door at a corner location diametrically opposite the multi-axis hinge and being releasable during both modes of operation while simultaneously releasing either of the two hinge-latches, comprising:

a pivotally mounted latching member movable between a door unlatched position in which the door is open, and a door latched position in which a portion of the vehicle is engaged to maintain the door in a closed condition,

latch release means including an arm pivotal between a first position engaging said latching member to hold it in its latched position and a second position out of engagement with said latching member, permitting it to rotate to its unlatched position,

a pivotally mounted hinge-latch release lever operably connected to one of said hinge-latches and movable between latched and unlatched positions for releasing the one hinge-latch, thereby permitting the tailgate door to open in the door mode of operation,

connecting means between said hinge-latch release lever and said latch release means to produce unlatching movement of the latch release arm as the hinge-latch release layer rotates from its latched to its unlatched operative position,

a lever supported for pivotal movement on said hinge-latch release lever about an axis offset from the rotational axis of said hinge-latch release lever and adapted to be actuated by a handle mounted on said door, thereby permitting independent rotation of said handle-actuated lever with respect to said hinge-latch release lever without corresponding rotation of said hinge-latch release lever and said connected latch release means,

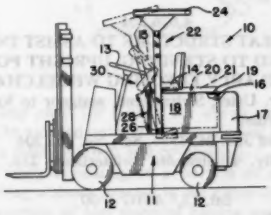
selectively operable lock means including a member pivotally moved to an unlocked position into engagement with said handle-actuated lever and in alignment with the axis of said hinge-latch release lever to produce simultaneous rotational movement of said handle-actuated lever and said hinge-latch release lever, thereby moving said latch release means to its unlatched position.

4,076,302

OPERATOR'S SEAT ASSEMBLY

Frank Robert Sable, Wickliffe, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Jul. 19, 1976, Ser. No. 706,347
Int. Cl.² B60N *1/02*
U.S. Cl. 296—65 R **9 Claims**



6. In an operator's seat assembly for use in industrial vehicles having a frame,

a seat, and

upstanding support means connected to said frame and to said seat for supporting said seat on said frame, the improvement comprising:

pivot means between said seat and said support means for pivotally securing said seat to said support means so as to allow rotation of said seat about said pivot means, and

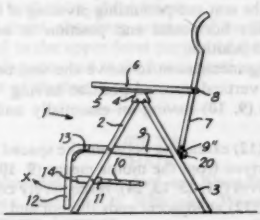
biasing means engaging said seat and said support means for urging said seat toward the front of said frame an amount sufficient to clear an opening normally partially covered by said seat when said seat is occupied by an operator.

4,076,303

EASY CHAIRS

Shalom Korenblit, Shderot Hayeled, Ramat Gan, Israel

Filed Jul. 14, 1976, Ser. No. 705,130
Claims priority, application Israel, Jul. 30, 1975, 47839
Int. Cl.² A47C *1/034*
U.S. Cl. 297—30 **1 Claim**



1. In an easy chair having two pairs of legs, the two legs in a pair being hingedly connected at their upper ends to form an inverted V - like structure, a seat being positioned between the two pairs of legs, a back support being connected to the seat to be angularly adjustable in relation to the seat, a support for the legs of a person occupying the chair being provided, such

support being swingable relative to the seat, the improvement wherein said leg support comprises a main U-shaped frame part which is swingably connected to the seat frame of the chair, the ends of said U-shaped frame part being bent through approximately 90° at the connection to the seat frame, and a pair of extensible struts which are hingedly connected to the front legs of the chair and to the said frame part of the leg support, each of said extensible struts comprising a sleeve pivotally connected to the front leg of the chair, a strut telescopically slidable within said sleeve, said strut being pivotably connected to said U-shaped frame part, a series of spaced locking slots formed in said strut, a crosswise extending slot in said sleeve, and a locking bar pivotally connected to said sleeve, said locking bar entering said crosswise extending slot in said sleeve and engaging one of said locking slots in said strut, whereby said strut is locked relative to said sleeve, whereby in position of use of the leg support, the main-horizontal-portion of said frame part is locked in position at a higher level than the seat.

4,076,304

ERECTING SEAT STRUCTURE TO ASSIST INVALIDS FROM SEATED TO STANDING, UPRIGHT POSITION, PARTICULARLY ERECTING WHEELCHAIRS

Conrad Deucher, Uster, Switzerland, assignor to Valutec AG, Uster, Switzerland

Filed Jan. 24, 1977, Ser. No. 762,204

Claims priority, application Switzerland, Jan. 30, 1976, 1184/76

Int. Cl.[2] A61G *5/00*

U.S. Cl. 297—45 **17 Claims**

1. Erecting wheel chair to assist users, particularly invalids, from seated to upright, standing position comprising

a frame (**1**) including laterally spaced frame members (**1*a*, 1*b***);

a seat (**27**) having a seating surface;

pivot means (**6, 7**) defining a seat pivot axis connecting the frame and the seat and permitting pivoting of the seat from an essentially horizontal end position to an essentially vertical end position;

a seat erecting mechanism to move the seat between horizontal and vertical, erected position having

motor means (**9, 10**) having an essentially uniform output speed,

a drive shaft (**12**) extending between the spaced frame members and driven from the motor means (**9, 10**), and

two crank drives (**11, 23; 13, 24**), respectively coupled to the drive shaft (**12**) at adjacent ends thereof and connected to the seat (**27**) to pivot the seat about its seat pivot means, and positioned to provide, with essentially uniform speed of the drive shaft (**12**), an erecting or lowering movement of the seat which is non-linear and has a time-displacement function which is essentially sinusoidal to start movement of the seat from one end position slowly then accelerate movement of the seat and, as the seat reaches its other end position to again move the seat slowly and thereby provide gradual smooth transition of the seat from stopped state at the end positions with an intermediate movement a speed which is high with respect to the speed of the seat when adjacent the limiting, end position;

a back rest (**37**);

means (**41, 41'**) coupling the seat to the backrest to move conjointly with said temporally non-linear movement of the seat including

parallelogram link means (**8, 41, 42**) and a backrest pivot (**41'**) maintaining the backrest (**37**) in essentially vertical position at all intermediate locations between the end limiting positions of the seat, the backrest pivot means (**41'**), being located above the level of the seat by a distance corresponding approximately to the height of the hip joint above the seating surface of the body of the user, so that, upon change of the seat from seating position to erected position, substantial relative movement between the body of the user and the seat as well as the backrest are avoided, and

a footrest (**75, 76**) linked to the seat (**27**), the link between the footrest and the seat including a footrest pivot (**86**) located below the level of the seat and arranged to prevent substantial relative movement between the body of the user and the footrest during said temporally non-linear movement of the seat upon change of the position of the seat between seated and standing, upright position, said footrest including

a link element (**77, 78**) linking the footrest pivot (**86**) to the frame, said link element being connected to the frame (**1**) behind the front edge of the seat and below the seating surface and being pivoted to the frame (**1**), and

floor support means (**79, 80**) movably linked to the seat to move upwardly when the seat is in a horizontal, seating position and to move downwardly when the seat is its end limit erected position to provide a solid ground support when the chair is erected.

4,076,305

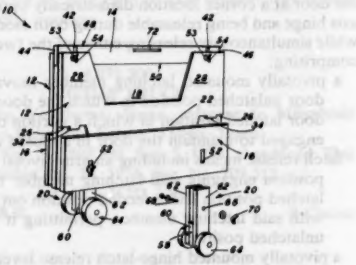
KNOCK-DOWN MOBILE PICNIC TABLE AND BENCH ASSEMBLY

Dwayne Sullivan, Markedtree, Ark., assignor to Lawrence Peska Associates Inc., New York, N.Y.

Filed Mar. 29, 1977, Ser. No. 782,514

Int. Cl.[2] A47B *3/06*

U.S. Cl. 297—157 **7 Claims**



1. A knock-down mobile picnic table and bench assembly comprising in combination:

a pair of leg members each of which includes a pair of medial oppositely extending horizontal bench-support shoulders, each of said shoulders having at least one upwardly projecting tab element, an upper table top-support edge surmounting each of said leg members, at least one upwardly projecting tab element integral with each of said table top-support edges, a vertical notch in each of said leg members extending inwardly from the table top-support edge thereof, and a pair of spaced apertures in each said leg member adjacent the edge, parallel to and remote from said table top-support edge;

an elongated ridge member having a notch formed therein extending inwardly from a longitudinally extending face adjacent each of the opposed ends thereof, said notches being of sufficient width to permit interlocking of the ridge member with said leg members such that the opposed longitudinally extending face is substantially flush with the table top-support edges of said leg members;

a pair of elongated bench members each of which includes apertures formed therein of such dimensions and at such locations as to be cooperable with the corresponding tabs on the shoulders of said leg members such that said bench members may be mounted in releasable interlocking relation with said shoulders;

a table top dimensioned so as to be superimposed upon said leg members and having apertures formed therein of such dimensions and at such locations as to be cooperable with corresponding tab elements on the table top-support edges of said leg members, whereby the table top may be mounted in releasable interlocking relation on said leg members;

the apertures in said bench members being alignable with corresponding apertures in said table top and the apertures in said leg members being alignable with the notches in said ridge member such that said bench members, leg members, table top and ridge member may be positioned in face-to-face stacked relation to receive fastening means through the aligned apertures and notches and thereby join such components releasably in a unitary stacked assembly; and

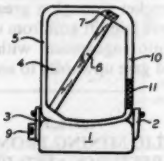
a pair of wheel assemblies adapted to rollably support the stacked assembly and be releasably secured to said stacked assembly.

4,076,306

VEHICLE SEAT REST

Roland Satzinger, Hammelburger Str. 21a, D-8731 Euerdorf, Germany

Filed Sep. 9, 1976, Ser. No. 721,722
Claims priority, application Germany, Oct. 15, 1975, 2546157
Int. Cl.[2] B60R *21/10*
U.S. Cl. 297—216 4 Claims



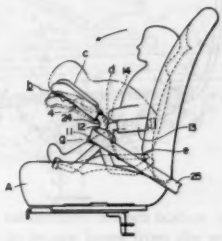
1. In a vehicle seat rest having a shoulder belt, one end of which is fastened to said rest, said belt running obliquely across said rest to a belt lock on the opposed side thereof, the improvement wherein said seat rest has a rectangular frame including two vertical sides, means disposed on one vertical side for effecting deformation thereof in response to a substantially perpendicular force applied to the opposite vertical side and means comprising a rigid cross-stay running from the region of the point to which said belt is attached obliquely in the same direction as said belt to the region of said belt lock for both preventing a reduction in the distance between the fastening points of the shoulder belt and maintaining a constant angle of application of the belt to the held body during application of the force and deformation of the one vertical side.

4,076,307

SAFETY CHAIR FOR A CHILD FOR USE IN MOTOR VEHICLES

Kunio Nanba, and Taro Ogawa, both of Kurashiki, Japan, assignors to Namba Press Kogyo Kabushiki Kaisha, Kurashiki, Japan

Filed Sep. 7, 1976, Ser. No. 720,591
Claims priority, application Japan, Jan. 23, 1976, 51-7067[U]
Int. Cl.[2] A47D *1/10*
U.S. Cl. 297—250 5 Claims



1. A safety chair for a child for use in motor vehicles arranged to be secured onto the passenger seat of the vehicle by means of a safety lap belt and comprising:

a chair body consisting of a portion of soft material for absorbing a shock exerted to the upper torso of the child, said portion of soft material having some hardness and having a narrower width in the middle thereof, a portion of cushion material for absorbing a shock exerted to the child's head, said portion of cushion material being provided at the front of said portion of soft material, and a seat plate having a proper hardness and provided at the rear of said portion of soft material;

a frame for supporting the chair body having a front frame member and a rear frame member, firmly secured at the intermediate portions thereof with each other, said front frame member comprising an upper front portion inclining in the forward and the upward directions from said intermediate portion, a lower front portion and leg portions extending slantingly in the forward and the downward directions from said intermediate portion, each connected in this order, said rear frame member comprising armrests inclining slightly in the upward direction and extending in the rearward direction from said intermediate portion and leg portions extending in the rearward direction from said intermediate portion, each connected in this order, said upper front portion having a weakened portion against mechanical strength so that the portion is bent in the downward direction when shocks are exerted thereto; and

spaces into which both legs of the child are inserted respectively, formed between said narrow portion of soft material and both sides of the frame;

said head-shock absorbing portion of the chair body being attached to the upper front portion of the frame, said seat plate being attached to the lower portion of the rear frame member of the frame.

4,076,308

CHAIR

Siegfried Slabon, Salzhemmendorf, and Klaus Franck, Elze, both of Germany, assignors to Wilkhahn, Wilkening & Hahne, Eimbeckhausen, Germany

Filed May 19, 1977, Ser. No. 798,493
Claims priority, application Germany, May 22, 1976, 2623024
Int. Cl.[2] A47C *1/022*
U.S. Cl. 297—313 9 Claims

1. In a chair,

leg means,

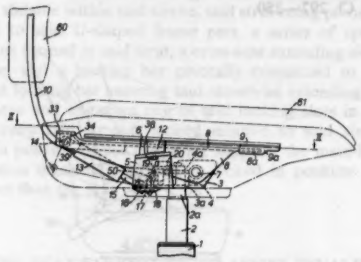
a support plate carried by the leg means,

an elongate member having a front edge portion, an intermediate portion, and a rear edge portion,

pivot means pivotally supporting the intermediate portion of the elongate member to the support plate,

a back rest secured to the rear edge portion of the elongate member,

a piston and cylinder assembly coupling the rear edge portion of the elongate member to the support plate and being



operable to allow the inclination of the back rest to be varied,

a seat portion bearing plate,

coupling means pivotally securing the bearing plate along the front edge of the elongate member, and

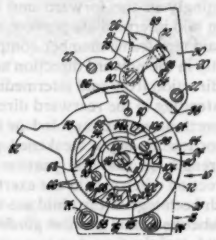
resilient pad means slidably mounted on the support plate to carry an intermediate portion of the bearing plate, the resilient pad means being slidable to vary the inclination of the bearing plate with respect to the support plate.

4,076,309

SEAT RECLINER INCLUDING ADJUSTMENT MECHANISM AND LATCH

Russell F. Chekirda, and Randall T. Murphy, both of Morristown, Tenn., assignors to Lear Siegler, Inc., Morristown, Tenn.

Filed Jan. 13, 1977, Ser. No. 758,964
Int. Cl.[2] B60N 1/02
U.S. Cl. 297—363 **8 Claims**



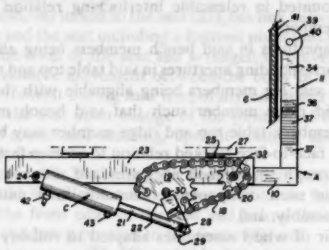
1. A seat recliner for adjustably controlling the angular orientation of a seat back relative to an associated seat cushion about a tilting axis, the recliner comprising: a seat cushion arm for securing the recliner to the seat cushion; a seat back arm for securing the recliner to the seat back and being pivotally connected to the seat cushion arm about the tilting axis; an adjustment mechanism including a positioning member pivotally movable relative to the arms about the tilting axis; the adjustment mechanism also including a locking dog mounted on one of the arms for movement between locking and nonlocking positions relative to the positioning member; said locking dog and positioning member having teeth that are interengaged in the locking position of the dog to adjustably locate the positioning member relative to the one arm about the tilting axis; and a latch for selectively securing the other arm to the positioning member, the latch including a latch member mounted on the other arm and having a latching position where the latch member extends between the positioning member and the other arm to locate the seat back arm in a tilted position corresponding to the adjusted position of the positioning member, and the latch member having a nonlatching position that releases the other arm from the positioning member and thereby allows tilting forward movement of the seat back arm to an easy-enter position, said other arm including two plates fixed to each other in a spaced relationship with the latch member of the latch mounted therebetween.

4,076,310

LIFT FOR TRUCK GATE

Howard G. Schwalm, 26697 Weld Co. Road #15, Loveland, Colo. 80537

Filed Jan. 24, 1977, Ser. No. 762,199
Int. Cl.[2] B60P 1/26
U.S. Cl. 298—23 MD **13 Claims**



1. A mechanism for lifting the hinged gate of a truck or trailer body and the like, comprising:

an actuator means carried underneath the body of the truck alongside the gate;

a lift arm pivotally mounted upon said actuator means below the hinge area of said gate, to be pivoted upwardly by the actuator means to move said gate from a lower open position to an upper closed position;

said actuator means including:

a smaller sprocket means connected to the pivotal mounting of said lift arm;

a larger sprocket means connected with the smaller sprocket means having a greater pitch diameter than said smaller sprocket means; and

thrust means for pivoting said larger sprocket means through a predetermined arc, thereby moving said smaller sprocket through a greater arc which is sufficient to move said lift arm from underneath the body of the truck into engagement with said gate and thence moving said gate upwardly to an upper closed position.

4,076,311

HYDRAULIC MINING FROM TUNNEL BY RECIPROCATED PIPES

Robert W. Johns, 349 Ashley Crescent SE., Calgary, Alberta, Canada

Filed Jan. 28, 1976, Ser. No. 653,037
Claims priority, application Canada, Jan. 29, 1975, 218912
Int. Cl.[2] E21C 45/00
U.S. Cl. 299—2 **11 Claims**

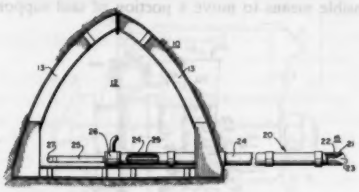
1. A method for the underground mining of subsidable mineral deposits comprising:

(a) providing at least one longitudinally extending tunnel within said subsidable deposit and adjacent the base thereof;

(b) inserting a plurality of hydraulic excavators a predetermined distance laterally into said deposits from at least one side of said tunnel, each of said excavators being positioned such that during operation, there is fluidic interaction between heads of adjacent excavators;

(c) commencing mining of said deposit at a location remote from said tunnel by fluidizing a zone of said deposit adjacent each said excavator head, and withdrawing mined material from said zone by suction;

(d) independently advancing and retracting each of said excavator heads, by programmed reciprocational movement thereof, thus expanding the fluidized zone over a predetermined distance, while permitting subsidence of minable material into said mining zone;



(e) continually extracting samples of mined materials from the material produced by each said excavator for determining the presence of any overburden therein;

(f) relocating each said excavator head by the retraction of each said excavator a predetermined distance towards said tunnel following evidence of overburden in said samples and continuing mining at the new location in the manner as originally done; and

(g) terminating excavation by each said excavator when said mining zone lies adjacent said tunnel.

4,076,312

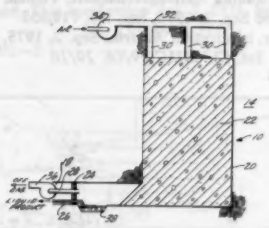
METHOD AND APPARATUS FOR RETORTING OIL SHALE AT SUBATMOSPHERIC PRESSURE

Chang Yul Cha, Bakersfield, Calif.; Richard D. Ridley, and Robert S. Burton, III, both of Grand Junction, Colo., assignors to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation-in-part of Ser. No. 492,823, Jul. 29, 1974, abandoned. This application Jul. 30, 1976, Ser. No. 710,108

Int. Cl.² E21B *43/18, 43/24, 43/26;* **E21C** *41/10*

U.S. Cl. 299—2 **16 Claims**



4. In a process for retorting oil shale in situ wherein a subterranean cavity is formed in a formation containing oil shale, the formation contains underground workings, the cavity contains a fragmented permeable mass of formation particles containing oil shale and the particles containing oil shale in the cavity are burned and produce product gases wherein the improvement comprises pumping gases from the bottom of the cavity at a rate sufficient to reduce the pressure within all parts of the cavity to a pressure below the ambient pressure within underground workings adjacent the cavity for preventing leakage of product gases from the cavity into such underground workings.

4,076,313

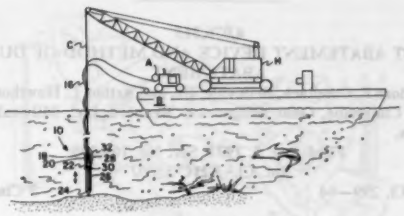
UNDERWATER RECOVERY APPARATUS

Frank P. Sperandeo, III, 3020 Autumn Branch Lane, Ellicott City, Md. 21043

Filed Aug. 20, 1976, Ser. No. 716,077

Int. Cl.² E02F *5/00*

U.S. Cl. 299—8 **8 Claims**



1. In a device for submersion in a sea bottom or the like and retrieval therefrom to secure items from the sea bottom, including: an elongate shank having an upper and a lower end, means for attachment proximate the upper end, a plurality of arms in radial array about the shank, each arm having a first end and a second end, means pivoting the first end of each arm proximate the lower end of the shank, whereby the arms can pivot from radial position to position folded along the shaft; means flexibly connecting the second end of each arm to the shank, a net supported by the arms, means for forcing the device into the sea bottom and means for spreading all said arms and net and screening material from the sea bottom on said retrieval, the improvement comprising: the means for forcing including means for vibrating said device the lower end of the shank having a conical header pointing downwardly, and means around the conical header for ejecting compressed gas downwardly for coacting with the conical header in penetrating the sea bottom.

4,076,314

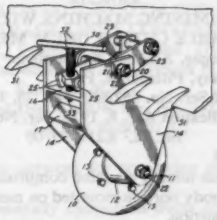
PAVEMENT CUTTING WHEEL MOUNTING FOR EARTH MOVING EQUIPMENT

Nicholas Anthony Dodich, Evergreen, Colo., assignor to Over-Lowe Company, Inc., Englewood, Colo.

Filed Oct. 6, 1976, Ser. No. 729,957

Int. Cl.² E01C *23/09*

U.S. Cl. 299—40 **10 Claims**



1. A pavement cutting assembly for attachment to the earth engaging tool of a power driven earth working machine or the like, comprising:

a. a cutter wheel,

b. a supporting structure including means for mounting said wheel for free rotation about a horizontal axis,

c. means for detachably securing said structure to the earth engaging tool or the like of a power driven earth working machine,

d. said securing means including clamping means having

portions relatively movable with respect to one another and into engagement with opposite faces of the earth engaging tool for gripping the tool therebetween, and

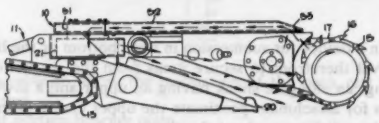
means movable relatively to said structure and positioned for engagement with the tool and tending to move upon forward movement of the tool during the cutting of pavement and to increase the effective gripping force of said clamping means.

4,076,315

DUST ABATEMENT DEVICE AND METHOD OF DUST ABATEMENT

Theodore F. Gundlach, Belleville, Ill., and Arthur L. Hawthorne, St. Clairsville, Ohio, assignors to Rexnord, Inc., Milwaukee, Wis.

Filed Aug. 5, 1971, Ser. No. 169,296
Int. Cl.² E21C *35/02*
U.S. Cl. 299—64 **3 Claims**



1. A machine and a dust abatement device, comprising:

a. a machine including a cutter head for acting on material so as to create an area of dust concentration, and

b. a dust abatement device on the machine located rearwardly of the cutter head, the device including:

1. a propulsion means including a fan and a power means for rotating the fan,

2. intake means for picking up and delivering air containing dry dust particulate from substantially the area of dust concentration to the fan,

3. a discharge outlet means,

4. means cooperating with the fan to provide a flow passage between the intake means and outlet means,

5. spray means directing liquid on the fan,

6. the fan including surfaces wetted by the liquid and located in the flow passage against which the dry dust particulate delivered to the fan impinges and is wetted to provide a slurry, and

7. the fan discharging both the cleaner air and the slurry together from the fan and flow passage and through the outlet means in a spray.

4,076,316

CONTINUOUS MINING MACHINE WITH LATERALLY MOVABLE CUTTER DRUM MEMBER

Maurice K. LeBegue, Ashland, Ky., assignor to National Mine Service Company, Pittsburgh, Pa.

Continuation of Ser. No. 552,857, Feb. 25, 1975, abandoned.
This application Apr. 8, 1976, Ser. No. 675,141
Int. Cl.² E21C *25/06*
U.S. Cl. 299—64 **8 Claims**

1. A continuous mining machine comprising,

an elongated body portion mounted on means for propelling said body portion,

a boom member pivotally secured to said body portion and extending forwardly therefrom,

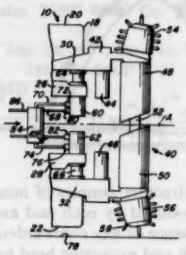
said boom member including support means positioned laterally of said boom member and extending forwardly therefrom, said support means connected to said boom member for slidable movement laterally toward and away from said boom member,

a unitary drum member rotatably supported by said support means at the forward end portion thereof transversely to said body portion for lateral movement thereto, said unitary drum member having end portions and an intermediate portion therebetween, said unitary drum member having cutting elements extending therefrom to cut a continuous kerf from the mine face,

a gathering device extending forwardly from said body portion for gathering and feeding material dislodged by said unitary drum member rearwardly from said body portion, said gathering device having side edge portions,

means to elongate said unitary drum member to an extended position, said unitary drum member in an extended position having a length greater than the width of said gathering device,

extensible means to move a portion of said support means



laterally toward said boom member and simultaneously move a second portion of said support means laterally away from said boom member, and

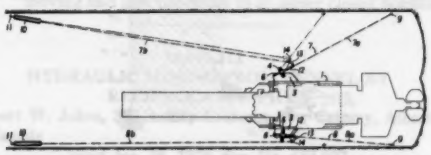
said extensible means operable upon actuation to laterally move said boom member support means and thereby laterally move said unitary drum member relative to said gathering device on said body portion to a position where a selected one of said gathering device side edges extends beyond the respective one of said unitary drum member end portions so that said gathering device side edge gathers the material dislodged by said unitary drum member end portion.

4,076,317

DEVICE FOR GUYING A MOVABLE CUTTING MACHINE

Alfred Zitz, and Herwig Wrulich, both of Zeltweg, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Sep. 1, 1976, Ser. No. 719,655
Claims priority, application Austria, Sep. 2, 1975, 6771/75
Int. Cl.² E21C *29/08, 29/10*
U.S. Cl. 299—75 **8 Claims**



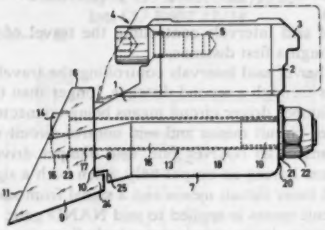
1. In combination with a cutting machine of the kind having a frame mounted on a caterpillar drive and a cutting device projecting forwardly from the frame for cutting into a mine face: a system for guying the machine in a cutting position and for moving the machine on an ascending gallery, said system comprising a driven capstan winch carried at each side of the machine and a flexible tension member having a portion of its length intermediate its ends wrapped around each capstan winch, said tension members having forward ends anchored in rock ahead of the machine and having rearward ends anchored in rock earth behind the machine.

4,076,318

CUTTER BIT ASSEMBLIES FOR COAL PLOUGHS

Alois Hauschopp, Werne, and Oswald Breuer, Dortmund-Husen, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Germany

Filed Aug. 30, 1976, Ser. No. 718,502
Claims priority, application Germany, Aug. 30, 1975, 2538682; Aug. 30, 1975, 2538648
Int. Cl.² E21C 35/18
U.S. Cl. 299—91 10 Claims



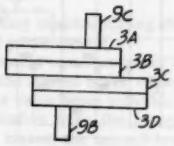
1. In a coal plough having a pocket for receiving the holder of a cutter bit assembly, the improvement comprising a cutter bit assembly having a cutter part and a holder part, the holder part having a base which is insertable into the pocket of the coal plough, and a headpiece, an elongate threaded member extending from the cutter part through the headpiece of the holder part in a direction substantially parallel to the intended cutting direction, a nut engaging on the threaded member to detachably secure the cutter part to the holder part, engaging faces on the headpiece and the cutter part which extend substantially perpendicularly to the intended cutting direction, and at least one interengaging projection and recess between the headpiece and the cutter part to secure the cutter part against rotation about the axis of the threaded member.

4,076,319

NESTED WHEEL ASSEMBLY

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Division of Ser. No. 582,087, May 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 507,715, Sep. 20, 1974, abandoned. This application Jul. 2, 1976, Ser. No. 702,063
Int. Cl.² B60B 37/10
U.S. Cl. 301—1 3 Claims



1. In an assembly of a pair of wheel structures, each including a solid wheel normally imperforate between hub and rim and an axle on which the wheel is rotatably supported and secured against removal therefrom, means for nesting said wheel structures to reduce the space occupied thereby comprising:

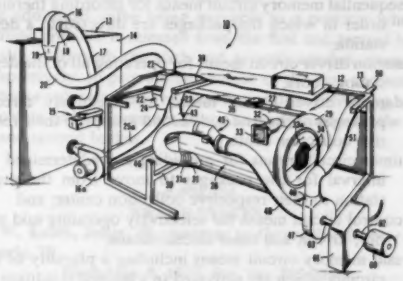
each of said wheels being formed with an aperture complementarily formed relative to an axle and positioned between its hub and rim to receive the axle of the other wheel structure therethrough with said wheels positioned in closely adjoining relationship.

4,076,320

DOWN FILLING MACHINE

David Reiss, 1315 Davenport Road, Toronto, Ontario M6H 2H4, Canada

Filed Dec. 29, 1975, Ser. No. 645,267
Claims priority, application Canada, Apr. 11, 1975, 234434
Int. Cl.² B65G 53/28
U.S. Cl. 302—3 8 Claims



1. Apparatus for weighing material such as down feathers, and the like, comprising a storage bin for storing said material, a frame member, a cylindrical drum having its longitudinal axis disposed horizontally and supported from said frame member by means of first and second spaced apart parallel cantilever springs affixedly secured to said frame member and to points at the top and bottom of said drum, respectively, whereby said drum is allowed to move in the vertical direction;

said apparatus further comprising means for measuring vertical displacement of said drum and for generating output signals indicative of said displacement, transport means for transporting said material from said bin to said drum by means of a flow of air;

said drum having first and second vertical walls, a first opening in said first wall having a cross sectional area substantially smaller than the cross sectional area of said drum communicating with said transport means; and a second opening in said second wall in substantial axial alignment with said first opening, a discharge outlet opening in the cylindrical wall of said drum located in proximity of the lower edge and on one side of said drum and an air inlet opening in said cylindrical wall and on said one side of said drum located in proximity of the upper edge of said drum.

4,076,321

ELECTRONIC CONTROL SYSTEM FOR OPERATING A PNEUMATIC TRASH LINEN CONVEYING NETWORK

Nicholas Haight, Pompton Lakes, and Trygve T. Madsen, Pompton Plains, both of N.J., assignors to Eastern Cyclone Industries, Inc., Fairfield, N.J.

Filed Dec. 6, 1976, Ser. No. 747,887
Int. Cl.² B65G 51/02
U.S. Cl. 302—27 6 Claims

1. A pneumatic network for conveying packages said network including:

a system of generally cylindrical ducts connected to each other for conveying the packages therethrough;

a deposit station at an entrance end of each duct for receiving and preliminarily storing the packages to be conveyed, said deposit station having an inner door for admitting the packages to the duct system;

a first collection center connected to a delivery end of the duct system for receiving a first group of packages after they have been conveyed through the duct system;

a second collection center connected to the delivery end of the duct system for receiving a second group of packages after said second group of packages has been conveyed through the duct system;

an evacuation pump connected to the duct system for drawing air through the duct system to move said first and second groups of packages toward their respective collection center;

control means for connecting all of said deposit stations, and for operating all of the deposit station doors, and for selectively directing packages of the first and second groups to their respective collection centers, said control means comprising:

sequential memory circuit means for recording therein the order in which the packages are directed to a deposit station;

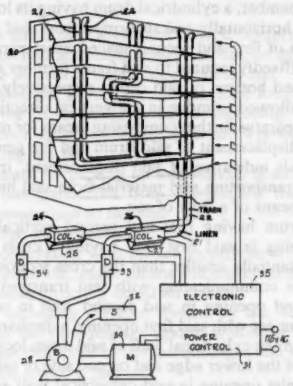
station driver circuit means for operating all of the deposit station doors;

damper driver circuit means for selectively directing packages of the first and second groups to their respective collection center;

timer circuit means for providing a predetermined time interval for the packages to move from the deposit station to their respective collection center; and

control circuit means for selectively operating said memory, driver, and timer circuit means;

said memory circuit means including a plurality of latch circuits which are activated to a latched condition by a manual push button at one of the deposit stations, said latch circuits being connected to the timing circuit



means for return to an unlatched condition when a predetermined time interval is ended, said memory circuit means further including first encoding means for converting decimal information into binary information to be sent to the control circuit means and first decoding means for converting binary information into decimal information for resetting said memory circuit means after the packages have been conveyed to their respective collection center;

said control circuit means including a programmable member, the outputs of said programmable member being programmed to operate said system in accordance with a particular application, said control circuit means further including a first binary counting means for creating a binary address for each deposit station, the outputs of said first counting means forming a fixed input to said programmable member, the outputs of said first counting means being connected to said memory circuit means for sensing which deposit station is activated, said control circuit means further including a second binary counting means the outputs of said second binary counting means forming a variable input to said programmable member whereby for every change in the output of said second counting means, the input and output of said programmable member also changes, the outputs of said second binary counting means being applied to a second encoding means for creating an output for sequentially activating a plurality of latching circuits for sequentially receiving the output signals of said programmable member, the outputs of said programmable member being connected to said timer circuit means and said damper driver circuit means for controlling the conveyance of the packages through the network, said control circuit means further including a decimal counting means connected to said first binary counting means, the outputs of said decimal means being applied to a digital readout means;

said timing circuit means including at least two timing combinations producing two predetermined time intervals;

one of said intervals controlling the travel of packages through a first distance;

the other of said intervals controlling the travel of packages through a second distance, longer than the first;

said damper driver circuit means being connected to said timer circuit means and said control circuit means by means of an NAND gate, said damper driver circuit means having an output only when both a signal from said timer circuit means and a signal from said control circuit means is applied to said NAND gate;

said station driver circuit means including a second decoding means for receiving binary signals from the output of the first binary counting means of said control circuit means, as well as a signal from said timer circuit means, said second decoding means converting said binary signals to a decimal signal for operating the station door of a predetermined deposit station;

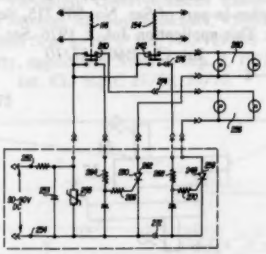
the respective circuit means of said control means being substantially universal from application to application, the programmable member of the control circuit means being unique to each particular application whereby the network operates in accordance with a particular application.

4,076,322

ELECTRO-PNEUMATIC BRAKE SYSTEM WITH VALVE ACTUATING CHECKING CIRCUIT

William W. Banker, and Anthony W. Lumbis, both of Watertown, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Aug. 20, 1976, Ser. No. 716,056
Int. Cl.[2] B60T *17/22*; G01L *5/28*
U.S. Cl. 303—1 **7 Claims**



1. An electro-pneumatic brake system for a rail vehicle, comprising:

a brake pipe for conveying pressure signals for brake application and release through said vehicle;

electrically operable release valve means having a first movable valve element and interconnecting said brake pipe with a source of pressure for repressurizing said brake pipe during brake release;

electrically operable application valve means having a second movable valve element and interconnecting said brake pipe with atmosphere for depressurizing said brake pipe during brake application;

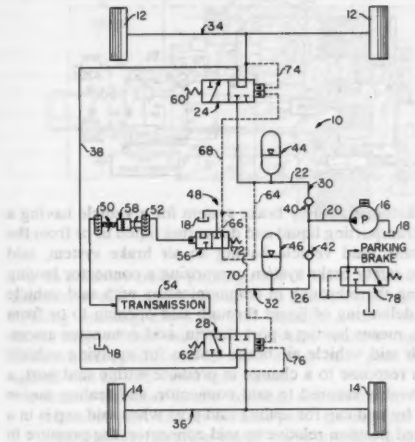
means actuated by said first movable valve element and responsive to opening of said release valve means for providing a continuous indication following opening of said release valve means until said application valve means is opened.

4,076,323

FLUID BRAKE SYSTEM FOR A VEHICLE

Neil W. Kroth, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 9, 1977, Ser. No. 795,037
Int. Cl.² B60T *13/14*
U.S. Cl. 303—6 R **6 Claims**



1. A fluid circuit for the braking system of a vehicle comprising:

fluid pump means;

first and second separate brake valves;

first conduit means communicating the first brake valve with the fluid pump means;

second conduit means communicating a first brake of the vehicle with the first brake valve;

the first brake valve being movable to a position providing communication from the pump means through the first conduit means, the first brake valve, the second conduit means, to the first brake of the vehicle, whereby fluid pressure is applied from the pump means to the first brake, the first brake valve being movable to a position wherein fluid pressure is released therethrough from the first brake;

third conduit means communicating the second brake valve with the fluid pump means;

fourth conduit means communicating a second brake of the vehicle with the second brake valve;

the second brake valve being movable to a position providing communication from the pump means through the third conduit means, the second brake valve, the fourth conduit means, to the second brake, whereby fluid pressure from the pump means is applied to the second brake, the second brake valve being movable to a position wherein fluid pressure is released therethrough from the second brake;

an additional valve;

fifth conduit means communicating the additional valve with the fluid pump means;

sixth conduit means communicating the additional valve with the first brake valve;

seventh conduit means communicating the additional valve with the second brake valve;

the additional valve being movable to a position providing communication from the pump means through the fifth conduit means, the additional valve, the sixth conduit means to the first brake valve to determine a position of the first brake valve whereby fluid pressure is released from the first brake, said movement of the additional valve providing communication from the pump means through the fifth conduit means, the additional valve, the seventh conduit means to the second brake valve to determine a position of the second brake valve, whereby fluid pressure is released from the second brake;

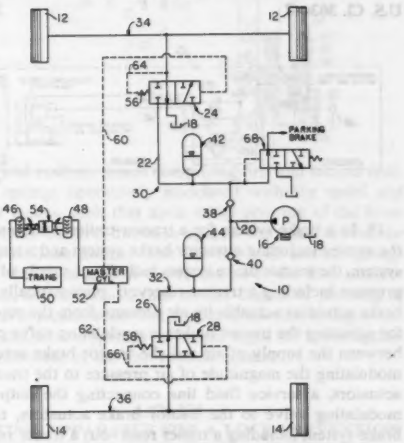
the additional valve being movable to a position wherein fluid pressure is released from the first and second brake valves through the sixth and seventh conduit means respectively, to provide movement of the first and second brake valves to their respective positions providing application of fluid pressure from the pump means to the first and second brakes.

4,076,324

BRAKE SYSTEM

Neil W. Kroth, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 9, 1977, Ser. No. 795,035
Int. Cl.² B60T *13/14*
U.S. Cl. 303—6 R **9 Claims**



1. A fluid circuit for the braking system of a vehicle comprising:

fluid pump means;

first and second separate brake valves;

first conduit means communicating the first brake valve with the fluid pump means;

second conduit means communicating a first brake of the vehicle with the first brake valve;

the first brake valve being movable to a position providing communication from the pump means through the first conduit means, the first brake valve, the second conduit means, to the first brake of the vehicle, whereby fluid pressure is applied from the pump means, to the first brake, the first brake valve being movable to a position wherein fluid pressure is released therethrough from the first brake;

third conduit means communicating the second brake valve with the fluid pump means;

fourth conduit means communicating a second brake of the vehicle with the second brake valve;

the second brake valve being movable to a position providing communication from the pump means through the third conduit means, the second brake valve, the fourth conduit means, to the second brake, whereby fluid pres-

sure from the pump means is applied to the second brake, the second brake valve being movable to a position wherein fluid pressure is released therethrough from the second brake;

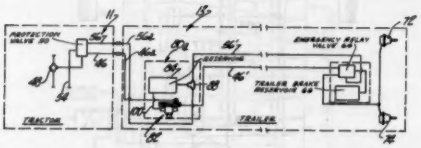
a master cylinder; and

means operatively associated with the master cylinder and first and second brake valves comprising additional conduit means interconnecting the master cylinder and first and second brake valves, by providing selective movement of the first and second brake valves to their respective positions providing communication between the pump means and first and second brakes respectively, and for providing selective movement of the first and second brake valves to their respective positions providing release of fluid pressure from the first and second brakes by operation of the master cylinder.

4,076,325
PNEUMATIC BRAKING SYSTEM FOR TRACTOR-TRAILER COMBINATIONS

Robert John Bray, Huntington Woods, Mich., assignor to Proven Environmental Products, Inc., Auburn Heights, Mich.

Filed Mar. 17, 1976, Ser. No. 667,730
Int. Cl.² B60T *13/00*
U.S. Cl. 303—7 **33 Claims**

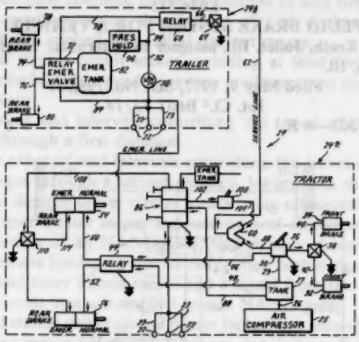


19. In a brake system for a tractor-trailer combination with the system including a tractor brake system and a trailer brake system, the tractor brake system including a supply of air under pressure including a tractor reservoir, pneumatically actuated brake actuators actuable by air pressure from the supply of air for actuating the tractor brakes, a modulating valve connected between the supply of air and the tractor brake actuators for modulating the magnitude of air pressure to the tractor brake actuators, a service fluid line connecting the output of the modulating valve to the tractor brake actuators, the trailer brake system including a trailer reservoir, a trailer relay valve connected to the trailer reservoir and connected to pneumatically actuated brake actuators, a trailer service line connected to the trailer relay valve for transmitting a pressure signal to the trailer relay valve whereby that valve will transmit fluid pressure from the trailer reservoir to the trailer brake actuators with the transmitted pressure varying in accordance with the magnitude of the pressure in the tractor service line, said trailer brake system comprising; fast acting amplifying relay valve means for providing an output pressure greater than an input pressure by a preselected ratio, an auxiliary reservoir separate from the tractor reservoir and trailer reservoir, first conduit means connected to said relay valve means for providing said input pressure thereto as a function of the magnitude of the fluid pressure at the tractor brake actuators, second conduit means for connecting said auxiliary reservoir to provide said output pressure, third conduit means for connecting said output pressure to the trailer service line whereby said output pressure will provide the pressure signal to the trailer relay valve the trailer brake system including a trailr emergency line connected to the supply of air and further comprising fourth conduit means for connecting the trailer emergency line to an input of said auxiliary reservoir for charging said auxiliary reservoir and dump valve means for venting the air pressure from the trailer emergency line and said auxiliary reservoir when the pressure therein drops to a preselected minimum.

4,076,326
AUTOMATIC SAFETY BRAKE SYSTEM

Joe B. D'Angelo, 8719 Stanwood, Dallas, Tex. 75228

Filed Dec. 22, 1976, Ser. No. 753,369
Int. Cl.² B60T *17/04*
U.S. Cl. 303—18 **12 Claims**

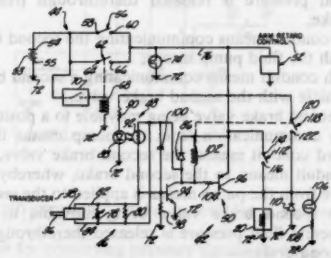


1. An automatic safety brake system for a vehicle having a tank for transporting liquid and delivering liquid to or from the vehicle tank, said vehicle having an air brake system, said automatic safety brake system comprising a connector having an opening therethrough in communication with said vehicle tank for delivering of liquid through said opening to or from said tank, means having a port therein, said connector associated with said vehicle air brake system for applying vehicle brakes in response to a change in pressure within said port, a cap removably secured to said connector, and sealing means operable by said cap for sealing said port when said cap is in a preselected position relative to said connector, the pressure in said port being at a different level with the sealing means in sealing engagement with said port than out of such sealing engagement.

4,076,327
REMOTE CONTROL CIRCUIT FOR ELECTRIC TRAILER BRAKES

Harold C. Hubbard, Lansing, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.

Division of Ser. No. 615,234, Sep. 22, 1975, Pat. No. 4,033,630.
This application Apr. 14, 1977, Ser. No. 787,548
Int. Cl.² B60T *13/74*
U.S. Cl. 303—20 **5 Claims**



1. In an electronic brake control circuit for trailers equipped with electric brakes of the type in which brake torque is a function of electric current through an electromagnetic brake coil, said control circuit including means to provide an output to said coil as a function of displacement of an operator-responsive control arm, the combination comprising means to provide an electrical signal which varies as a function of said controller output, and electromagnetic means magnetically

coupled to said control arm to retard displacement thereof as a function of said electrical signal.

4,076,328

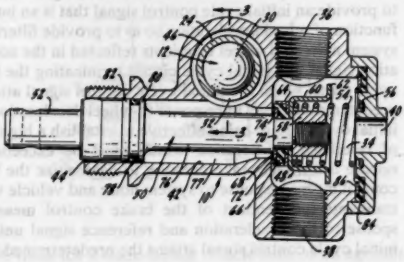
TRACTOR-TRAILER PARKING DASH CONTROL VALVE WITH TWO-WAY CHECK VALVE

Charles Horowitz, Niles, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Continuation of Ser. No. 575,469, May 7, 1975, abandoned. This application Aug. 18, 1976, Ser. No. 715,441

Int. Cl.² B60T *13/38*

U.S. Cl. 303—50 **4 Claims**



1. In a tractor-trailer parking control valve, a housing, a first chamber in said housing, a pair of air pressure inlet ports in said housing opening into said first chamber, valve seat means about each of said inlet ports, a valve member within said chamber and positioned to close either inlet port by seating against one of said valve seat means,

a second chamber in said housing, at least one spring brake chamber port and an exhaust port opening into said second chamber, a spring-biased valve member in said second chamber for opening and closing communication between said spring brake chamber port and exhaust port, an annular elastomeric valve seat surrounding said exhaust port, a seating surface on said spring-biased valve member positioned to close upon said elastomeric valve seat, and a coil spring in said second chamber normally urging said seating surface away from said valve seat,

pasage means between said first and second chamber including a bore within said housing in communication with said second chamber and opening to the exterior of said housing, said passage means including a passage between said bore and first chamber, a valve stem connected to said spring-biased valve member and movable in said passage means bore, a seal carried by said spring-biased valve member and positioned to close communication between said second chamber and said passage means bore, a seal member carried by said valve stem and bearing against said bore, said passage being in communication with said bore intermediate said seal and seal member, said spring-biased valve member controlling communication between said passage means and said brake chamber port.

4,076,329

BRAKE MODULATION VALVE FOR PEDAL-APPLIED BRAKES

David G. Johnson, Peoria, and James P. Mueller, East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 12, 1977, Ser. No. 758,540

Int. Cl.² B60T *15/04*

U.S. Cl. 303—56 **11 Claims**

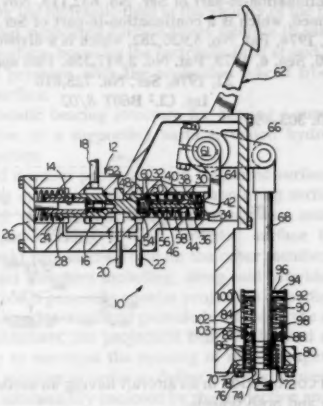
1. In a brake control mechanism including a spool movable in the bore of a body to a first porition wherein the brake of a vehicle is released, and to a second position wherein the brake of a vehicle is applied;

first resilient means operatively associated with the spool and body for urging the spool toward the second position;

lever means pivotably mounted relative to the body;

second resilient means operatively associated with the spool and lever means for urging the spool against the resilience of the first resilient means, the second resilient means urging the lever in a first pivotal direction;

third resilient means operatively associated with the body and lever means for biasing the lever means in a second pivotal direction, the lever means being pivotable in the first pivotal direction against the bias of the third resilient means allowing the second resilient means to extend, in turn allowing the first resilient means to extend to move the spool from its first toward its second position;



the second resilient means comprising first and second resilient springs operatively associated with the spool and lever means, such that upon initial pivoting of the lever means in the first direction against the resilience of the third resilient means, both the first and second springs urge the spool against the resilience of the first resilient means, and upon a further certain degree of pivoting of the lever means in the first direction, the first spring of the first and second springs no longer urges the spool against the resilience of the first resilient means.

4,076,330

DETECTING APPARATUS FOR A LOCK PREVENTION SYSTEM FOR DETECTING WEAR OF VEHICLE BRAKES

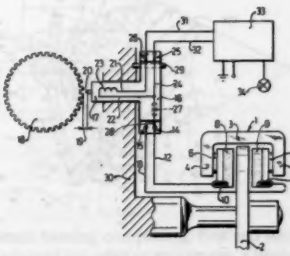
Heinz Leiber, Leimen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 11, 1977, Ser. No. 767,860

Claims priority, application Germany, Feb. 14, 1976, 2606012

Int. Cl.² B60T *17/22*

U.S. Cl. 303—92 **7 Claims**



1. In combination, a detecting apparatus and a wheel locking prevention system for vehicle brakes, comprising:

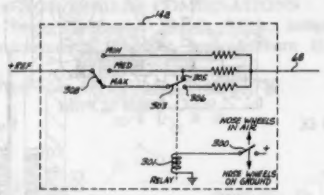
a detector including a pulse generator, a pulse wheel disposed opposite to the pulse generator and pulse circuit;
an electronic switch connected to the pulse circuit;
a monitoring device which insures a correct operation of the wheel locking prevention system; and
a brake lining wear-indicating device connected to the pulse generator.

4,076,331

AIRCRAFT AUTOMATIC BRAKING SYSTEM

Garrett Howard DeVlieg, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 632,113, Nov. 14, 1975, abandoned, which is a continuation-in-part of Ser. No. 477,244, Jun. 7, 1974, Pat. No. 3,920,282, which is a division of Ser. No. 394,890, Sep. 6, 1973, Pat. No. 3,917,356. This application Sep. 22, 1976, Ser. No. 725,610
Int. Cl.² B60T *8/02*
U.S. Cl. 303—93 **3 Claims**



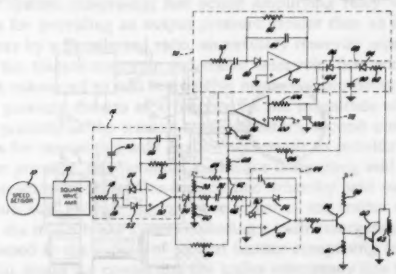
1. In combination in an aircraft having an automatic braking system and nose wheels:
pilot selectable switching means for commanding a level of deceleration upon landing of the aircraft;
second means for detecting aircraft nose wheel contact with a runway surface; and,
third means responsive to said second means for commanding a level of deceleration less than the level selected by said pilot selectable switching means when the aircraft nose wheels are not in contact with the runway surface and providing said pilot commanded level of deceleration when the aircraft nose wheels are in contact with the runway surface.

4,076,332

WHEEL LOCK CONTROL CIRCUIT

David W. Taylor, Davison, and Philip R. Peterson, Grand Blanc, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 24, 1977, Ser. No. 761,896
Int. Cl.² B60T *8/08*
U.S. Cl. 303—97 **2 Claims**



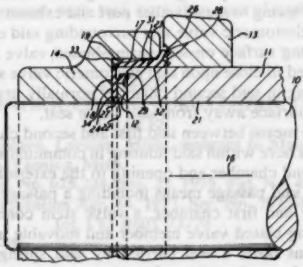
1. A wheel lock control system for a vehicle with braked wheels and characterized by its insensitivity to system noise and vehicle and wheel transients comprising:
means effective to provide an acceleration signal which is a function of wheel deceleration and wheel acceleration;
means effective to provide a two-component reference signal, one component being independent of initial cycle and representing a reference wheel deceleration and the other component being determined by an initial cycle circuit effective to generate an artificial initial cycle signal having a predetermined magnitude representing a high level of wheel deceleration;
brake control means responsive to the acceleration and reference signals effective to cyclically relieve and apply wheel brake pressure when the acceleration and reference signals attain predetermined relationships; and
circuit means responsive to the acceleration signal effective to provide an initial cycle control signal that is an integral function of wheel deceleration so as to provide filtering of system noise and wheel transients reflected in the acceleration signal, the initial cycle circuit terminating the initial cycle signal when the initial cycle control signal attains a predetermined level in response to wheel deceleration, the initial cycle circuit being effective to establish a high level of reference deceleration which must be exceeded to release the wheel brake pressure to desensitize the brake control means response to system noise and vehicle wheel transients independent of the brake control means response to the acceleration and reference signal until the initial cycle control signal attains the predetermined level.

4,076,333

TRACK JOINT WITH COMBINED THRUST MEMBER AND SEAL MEMBERS

John Merlin Baylor, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 26, 1976, Ser. No. 735,451
Int. Cl.² B62D *55/20*; F16J *15/34*
U.S. Cl. 305—11 **5 Claims**



1. A track joint with combined thrust member and seal members, comprising a track pin, a cylindrical bushing on said pin and having an annular end surface disposed on a plane transverse to the extent of and within the length of said pin, a first track link on said bushing, a second track link on the end of said pin and having an annularly-shaped bearing surface faced toward said annular end surface and being spaced therefrom, a seal assembly including a thrust portion having a rigid thrust ring disposed in the space between said surfaces and with a portion of said assembly extending in contact with both said surfaces for resisting axial thrust forces therebetween, said assembly including an elastic first seal portion bonded to said thrust ring and extending therefrom and contacting said bushing for sealing between said thrust ring and said bushing, and said assembly including an elastic second seal portion bonded to said thrust ring and extending into sealing contact with said pin for sealing thereat, said first elastic seal portion extending from said thrust ring in a cylindrical portion extending co-axially with said pin and between said track links and being under compression between said links and being free of restriction in the length of said cylindrical portion intermediate said links,

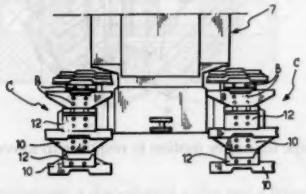
for torsional deflection to accommodate relative pivotal movement between said links.

4,076,334

TRACK FOR TRACK LAYING AGRICULTURAL TRACTORS AND LIKE VEHICLES

Renato Saetti, Turin, Italy, assignor to Fiat Trattori S.p.A., Modena, Italy

Filed Aug. 31, 1976, Ser. No. 719,483
Claims priority, application Italy, Sep. 26, 1975, 69397/75
Int. Cl.[2] B62D 55/28
U.S. Cl. 305—54 2 Claims



1. A track for a track-laying vehicle such as an agricultural tractor, comprising:

a plurality of links,

means for pivoting the links together to form a closed loop chain,

a plurality of soles fixed to respective links, and

ground engaging cleats on said plurality of soles, the cleats of adjacent soles being offset from one another in a direction transverse the length of the track, wherein alternate soles are of a first type having two of said ground engaging cleats aligned with one another across the width of said tracks and separated by a space,

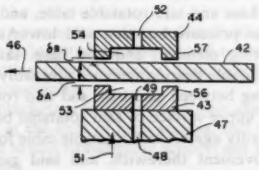
soles of a second type being located between said soles of said first type, said soles of said second type having a single cleat aligned along the length of the track with said space between said two ground engaging cleats of each of the adjacent soles of said first type, the width of said single cleat of said soles of said second type in a direction transverse the length of said track being substantially the same as that of said spaces between said two cleats of said soles of said first type and the width of said soles of said second type being less than that of said soles of said first type, and substantially the same as that of their single cleat.

4,076,335

HYDROSTATIC BEARING METHODS AND STRUCTURES

Nazeer Ahmed, Princeton; James Kevin O'Donnell, Raritan Township, Hunterdon County, both of N.J., and Glenn Lewis Schmehl, Lilburn, Ga., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Jun. 17, 1977, Ser. No. 807,626
Int. Cl.[2] F16C 17/00, 33/72
U.S. Cl. 308—3.5 18 Claims



1. A method of bearing a supported surface relative to a supporting surface, with a space between said surfaces, one of said surfaces including an opening for feeding a hydraulic fluid into said space, which method comprises the steps of:

a. providing a generally annular projection, substantially surrounding said opening, on a first of said surfaces, the projection extending into said space and toward the second of said surfaces, so as to define a cavity between the two surfaces substantially enclosed by the projection and communicating with the opening; and

b. feeding through the opening and into the cavity, at a predetermined pressure, a hydraulic fluid having an intrinsic shear strength sufficient to prevent substantially all leakage of the hydraulic fluid across the outer periphery of the projection without the aid of any additional seals for containing the hydraulic fluid in the vicinity of the projection as said supported surface floats relative to said supporting surface, borne by the hydraulic fluid at said predetermined pressure, with the projection spaced from said second surface.

5. A hydrostatic bearing structure for bearing a supported surface relative to a supporting surface, which hydrostatic bearing comprises:

a supported member providing said supported surface;

a supporting member providing said supporting surface;

one of said members including a passageway extending therein and opening at said provided surface thereof toward said provided surface on the other member;

a first of said members including, along said provided surface thereof, a generally annular projection extending into said space and toward said provided surface on the second of said members, the projection being so located as substantially to surround the opening of said passageway in said one member in order to define a cavity between said surfaces substantially enclosed by the projection and communicating with the opening; and

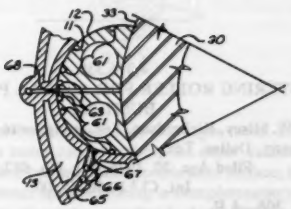
a source of a hydraulic fluid at a predetermined pressure connected to said passageway in said one member, said hydraulic fluid having an intrinsic shear strength sufficient to prevent substantially all leakage of the hydraulic fluid across the outer periphery of the projection without the aid of any additional seals for containing the hydraulic fluid in the vicinity of the projection as said supported surface floats relative to said supporting surface, borne by the hydraulic fluid at said predetermined pressure, with the projection spaced from said provided surface of said second member.

4,076,336

HYDROSTATIC BEARINGS WITH CONTROLLED LUBRICANT PRESSURE

Roy M. Howell, 115 Meadbrook Road, Garden City, N.Y. 11530

Continuation-in-part of Ser. No. 528,342, Nov. 29, 1974, Pat. No. 3,943,895. This application Feb. 2, 1976, Ser. No. 654,468
Int. Cl.[2] F16C 29/00
U.S. Cl. 308—3.5 5 Claims



1. A hydrostatic bearing comprising, first and second proximate surfaces adapted for relative movement, a liquid lubricant between said surfaces, and raised means on at least one of said surfaces peripherally defining at least two independent enclosed areas within which said lubricant is substantially con-

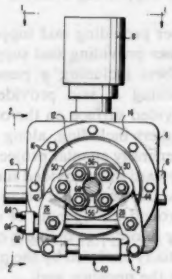
fined, a pressurized source of lubricant, means for introducing said lubricant into said enclosed area, and check valve means between said pressurized source and said enclosed area, said liquid lubricant being subjected to sufficient pressure to effect a predetermined minimum flow of lubricant from each said enclosed area at all times, said raised means restricting the rate of flow of the lubricant from within said enclosed area, whereby a major portion of the bearing load is borne by a thick film of said lubricant.

4,076,337

DRILL STEEL HOLDER

Ray Childress, P.O. Box 86, Richlands, Va. 24641

Filed Sep. 22, 1976, Ser. No. 725,649
Int. Cl.² F16C *31/00*
U.S. Cl. 308—3.9 **5 Claims**



1. A device for centering a drill steel for rotation about an axis of rotation of a chuck socket in a drill box, comprising,

a mounting plate adapted to be secured to said drill box,

a spaced pair of posts on the mounting plate,

a pair of levers having corresponding ends disposed on opposite sides of said chuck socket axis, means mounting said levers respectively on said posts for swinging movement in opposite directions towards and away from said socket axis,

a fluid actuated ram connected between said levers for effecting said swinging movement thereof,

a pair of rollers chassis plates pivotally supported on said corresponding ends of said levers for swinging movement about other axes which are parallel to said chuck socket axis and respectively disposed on opposite sides of said chuck socket axis,

and a spaced pair of rollers mounted on said chassis plates, said rollers being so disposed with respect to one another and the pivotal supports of said chassis plates as to bracket the said axis of rotation of the chuck socket.

4,076,338

CASTERING ROLLER FOR A DRILL PIPE GUIDE BUSHING

Robert W. Hisey, Richardson, Tex., assignor to Gardner-Denver Company, Dallas, Tex.

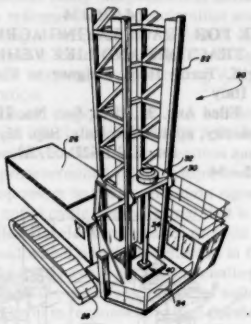
Filed Apr. 30, 1976, Ser. No. 682,123
Int. Cl.² F16C *19/00*
U.S. Cl. 308—4 R **4 Claims**

1. In a drill pipe bushing having control means for moving elements toward and away from a drill pipe in the region of the mouth of a well, the combination comprising:

a. a plurality of rollers in a circular array with the axes of said rollers normally parallel to the axis of the drill pipe,

b. support arms on said control means, and

c. means pivotally mounting said rollers on said support arms on axes in a plane perpendicular to the axis of the



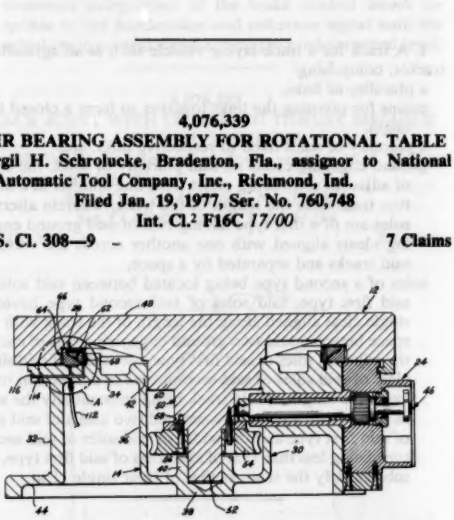
drill pipe for caster motion in response to movement of the pipe.

4,076,339

AIR BEARING ASSEMBLY FOR ROTATIONAL TABLE

Virgil H. Schrolucke, Bradenton, Fla., assignor to National Automatic Tool Company, Inc., Richmond, Ind.

Filed Jan. 19, 1977, Ser. No. 760,748
Int. Cl.² F16C *17/00*
U.S. Cl. 308—9 **7 Claims**

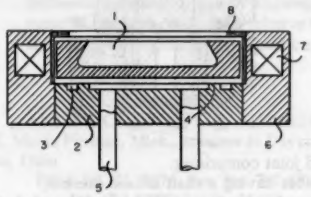


1. An improved bearing assembly for supporting a rotatable table on a fixed base for rotation about a substantially upright axis, said improved bearing assembly comprising, in combination, a fixed annular bearing member having an upper face and a lower face, said upper face having a surface area greater than said lower face, a rotatable annular bearing member in nesting and rotational relationship with said fixed bearing member, said rotatable bearing member having an upper surface and a lower surface, said lower surface having a greater surface area than said upper surface, said bearing members being positioned between said base and said rotatable table, and means for applying gaseous pressure between said lower surface of said rotatable hearing member, and said base, said air pressure lifting said rotatable bearing member upwardly for defining a gaseous bearing between said base and said rotatable bearing member, said upper surface of said rotatable bearing member moving upwardly against said rotatable table for simultaneous rotational movement therewith, and said gaseous pressure applying means further applying gaseous pressure between said fixed annular bearing member and said table for defining a gaseous bearing between said table and said fixed annular bearing member.

4,076,340
DRIVE AND BEARING SUPPORT FOR A DISC-SHAPED ROTOR

Peter Meinke, Grossinzemoos, and Wolfgang Huber, Schweinfurt, both of Germany, assignors to SKF Kugesssagerfabriken GmbH, Schweinfurt and Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Munich, both of, Germany

Filed Jul. 14, 1975, Ser. No. 595,686
Claims priority, application Germany, Jul. 12, 1974, 2433712
Int. Cl.[2] F16C *39/00*
U.S. Cl. 308—10 11 Claims

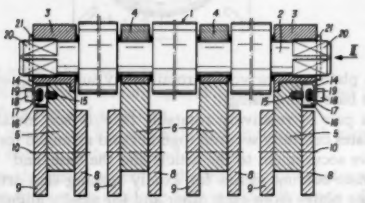


1. In combination, a disc-shaped rotor and a frame surrounding said rotor, said rotor having upper and lower radial surfaces and a peripheral surface, unitary means supported by said frame for magnetic bearing support and drive of said rotor, a plate facing said lower surface of the rotor and means coupled with said plate for producing a gas cushion for axial support of said rotor, said means for producing the gas cushion comprising at least one closable conduit having an end facing said lower surface of said rotor, said unitary means comprising a common annular coil system surrounding said rotor and disposed exactly opposite the rotor for effecting rotary drive of said rotor while suspending said rotor by magnetic effect independently of the gas cushion producing means and with the conduit closed, said conduit being openable during rotation of said rotor for applying a braking effect on said rotor.

4,076,341
FASTENING ARRANGEMENT FOR A LONGITUDINALLY MULTIPLY DIVIDED ROLLER TO BE USED IN CONTINUOUS CASTING PLANTS

Werner Scheurecker, Linz, and Franz Kagerhuber, Traun, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jul. 14, 1976, Ser. No. 705,288
Claims priority, application Austria, Jul. 18, 1975, 5572/75
Int. Cl.[2] F16C *35/04*
U.S. Cl. 308—20 8 Claims



1. A fastening arrangement for a roller divided into multiple sections along its longitudinal extent, said roller to be used in continuous casting plants having a strand guide support, the arrangement comprising:

supporting brackets arranged in the longitudinal direction of the roller at the ends of each section, said brackets being connected to said strand guide support and having pocket-like recesses;

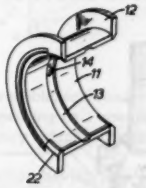
outer and inner roller holding means for exchangeably installing the roller in the strand guide support and being inserted in said pocket-like recesses of said supporting brackets, said outer roller holding means being at the ends of said roller and said inner roller holding means being at the junctions of the multiple sections of the roller;

detachable bolting means for connecting the outer roller holding means with their respective supporting brackets, the inner roller holding means lying loosely and unsecured in the respective pocket-like recesses of said supporting brackets.

4,076,342
BEARINGS

Ernest John Thorpe, Kenton, England, assignor to The Glacier Metal Company Limited, England

Filed Feb. 4, 1976, Ser. No. 654,970
Claims priority, application United Kingdom, Feb. 5, 1975, 4849/75
Int. Cl.[2] F16C *33/14*
U.S. Cl. 308—36 11 Claims

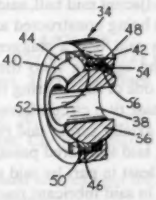


1. A self-supporting half-cylindrical plain bearing comprising a part-cylindrical journal shell and a separate part-annular end flange located radially and axially in relation to the shell by engagement in an annular recess in the back of the shell at one end and located circumferentially by co-operating shoulders on at least one notch in the shell and at least one lug on the flange, the edge of said flange being located in said recess.

4,076,343
SPHERICAL BEARING ASSEMBLY WITH INSERT MEMBER

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Inc., Fairfield, Conn.

Continuation of Ser. No. 512,132, Oct. 4, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 677,870
Int. Cl.[2] F16C *23/00*
U.S. Cl. 308—72 10 Claims



1. A spherical bearing assembly having a metal inner race member and an outer race member, the inner surface of the outer race member being a concave spherical surface, the outer surface of the inner member being a complementary convex spherical surface, the outer member including an annular recess the base of which is threaded, a first yieldable plastic annular ring having an outer surface threaded with threads complementary to the threads on the base of said recess, said ring threadably received in said recess, a second annular ring also received in said recess in a side-by-side relationship to said first annular ring, the second annular ring being made of a

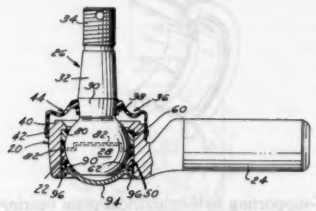
formable and yieldable plastic material, and the first and second annular rings providing a substantial portion which is more than half of the concave spherical surface of said outer race member, said first annular ring operationally capturing said second annular ring and said inner race member within said outer race member.

4,076,344

BEARING ASSEMBLY FOR A BALL AND SOCKET JOINT

Donald R. Gaines, Farmington; Jon M. Smallegan, Ann Arbor, and William H. Trudeau, Brighton, all of Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

Filed May 7, 1976, Ser. No. 684,392
Int. Cl.[2] F16C *11/06*
U.S. Cl. 308—72 9 Claims



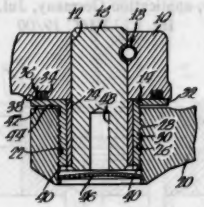
1. In a joint assembly with a socket member having an opening therethrough with a substantially cylindrical recess therein, a stud member with a ball received in said recess and a stud projecting therefrom through said opening to the exterior of said socket member, a seal member of a flexible material engaging both said stud and said socket member and constructed and arranged to provide a seal therebetween, and a pair of bearing rings substantially coaxially received in said recess and constructed and arranged to provide a bearing assembly surrounding and having a spherical surface bearing on a relatively large equatorial area of said ball between the polar regions thereof with interdigitating recesses and tongues overlapping the equator of said ball and having a sufficient thickness to substantially fill the space between said recess and said ball, the improvement comprising said seal member also being constructed and arranged to define in cooperation with said socket member a lubricant reservoir adjacent said ball, said recesses and tongues of said bearing rings being constructed and arranged to define in cooperation with said ball a staggered lubricant passage extending around and opening onto the equatorial region of said ball, at least the one of said bearing rings adjacent said seal member having at least two circumferentially spaced grooves extending generally axially across said ring, opening onto said ball, and connecting said staggered passage with said lubricant reservoir defined at least in part by said seal member such that a lubricant received in said lubricant reservoir can be supplied to the interface of said ball with said spherical surface of said bearing assembly through said generally axially extending grooves and said staggered lubricant passage, one of said bearing rings having an annular recess at an axially outer end and a radially outer surface thereof for receiving a load ring, a load ring of a compressible and resilient material received in said annular recess and extending generally axially beyond the outer end of said ring containing said annular recess, and means carried by said socket member and compressing said load ring into said annular recess so as to yieldably urge said bearing rings toward each other and into firm engagement with said ball whereby the joint assembly has wear take-up compensation.

4,076,345

SEALED JOINT CONSTRUCTION

Kevin George Forster, Peoria, and Harold Lawrence Reinsma, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 1, 1976, Ser. No. 719,624
Int. Cl.[2] F16C *11/00*
U.S. Cl. 308—120 A 5 Claims



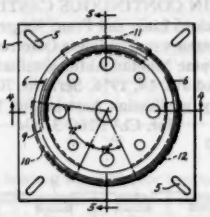
1. A sealed joint comprising:
a first member having a shaft affixed thereto;
a second member having a bore receiving said shaft;
an annular groove in said first member about said shaft and facing said second member;
an annular seal in said groove;
a sleeve within said bore and about said shaft and having a radially outwardly extending peripheral flange at the end nearest said first member, said flange engaging said seal; and
means for axially adjusting the position of said sleeve within said bore to selectively set the pressure of said flange on said seal.

4,076,346

FACE-TO-FACE PLATE-TYPE SWIVEL

Roy F. McMahan, Sr., Louisville, Ky., assignor to Roy F. McMahan, Jr. and William L. McMahan, both of Louisville, Ky.

Filed Oct. 6, 1976, Ser. No. 729,902
Int. Cl.[2] B60B *33/00*; F16C *17/00*
U.S. Cl. 308—237 R 7 Claims



1. A plate-type swivel for rotationally supporting an article upon a base, comprising:
A. a pair of relatively rotatable face-to-face metal swivel plates centrally secured together and arranged for respective securement to the article and the base; and
B. plate-bearing means for axially spacing said article and base plates from each other and for axially aligning them relative to each other and centering them for relative rotation about a center axis common to both.
1. said plate-bearing means being radially spaced a substantial distance from said common axis.
2. said radially spaced plate-bearing means including
a. a continuous circular V-shaped race formed in one metal plate to extend concentrically about said common axis and radially spaced a substantial distance therefrom, and
b. frictionless plastic bearing material not only interposed between said metal swivel plates with its opposite sides engaging opposite plates for bearing and spacing purposes but, for said axial aligning and cen-

tering purposes, also curved to conform to the circular curvature of said V-shaped race in said one metal plate,

i. one side of said material also being V-shaped to project into and conform to the V-shape of said race and extending sufficiently along the length of the race circle for axially aligning said bearing material and one metal plate relative to each other and for centering them about said common axis.

ii. the opposite side of said material and said other metal plate mutually cooperating to provide complementary means for axially aligning said bearing material and said other plate relative to each other and for centering them about said common axis.

4,076,347

ANTIFRICTION NYLON MEMBER

Lennis E. Meek, Portage, Mich., assignor to Dayco Corporation, Dayton, Ohio

Filed Jul. 21, 1976, Ser. No. 707,451
Int. Cl.[2] F16C *33/16, 33/20*
U.S. Cl. 308—238 **13 Claims**

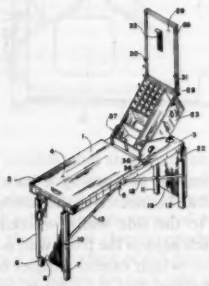
1. An antifriction nylon member comprising, from 4 to 10 parts by weight of a lubricant, from 0.10 to 0.20 parts by weight of a surfactant, and the balance of nylon, said lubricant being substantially uniformly dispersed throughout said nylon by said surfactant.

4,076,348

ARTIST'S KIT

Harvey W. Allison, Oakley, Kans., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 31, 1977, Ser. No. 783,295
Int. Cl.[2] A47B *97/08, 27/00*
U.S. Cl. 312—231 **2 Claims**



1. An artist's kit, comprising

a bench member having spaced opposite first and second ends, a top and a bottom;

a first pair of legs foldably mounted on the bench member at the bottom of the first end thereof;

first guide means affixed to the first pair of legs for removably supporting a palette between said first pair of legs;

a second pair of legs foldably mounted on the bench member at the bottom of the second end thereof;

second guide means affixed to the second pair of legs for removably supporting a canvas therebetween;

a storage box pivotally affixed at a pair of corners of the box to the bench at the top of the second end of said bench, said storage box being for paints, brushes and supplies, and having a lid movably affixed to the box for selectively covering the box, said lid having an inside surface; and

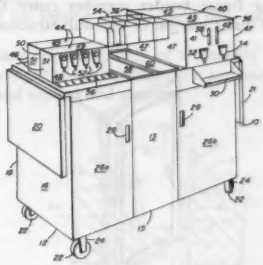
canvas supporting means on the inside surface of the lid of the storage box for releasably mounting a canvas thereon whereby said lid functions as an easel.

4,076,349

MOBILE BEVERAGE DISPENSING CART

Ronald L. Gettleman, Framingham, and Peter D. Stoner, Newton Centre, both of Mass., assignors to Gettleman-Stoner, Inc., Newton Centre, Mass.

Filed Jun. 17, 1977, Ser. No. 807,427
Int. Cl.[2] A47B *77/08*
U.S. Cl. 312—236 **8 Claims**



1. A mobile, convertible, self-contained hot and cold beverage storage and dispensing cart comprising:

a rectangular unitary cabinet structure mounted on a plurality of castors;

said cabinet structure having two end panels, two parallel side panels substantially longer than said end panels forming front and rear panels, and a base panel;

a plurality of liquid dispensing units mounted along the top edges of said side and end panels, said dispensing units being mounted at each end of said cabinet structure and accessible for service from both front and rear side panels; the bases of said liquid dispensing units being partially recessed within said cabinet structure;

a plurality of recessed, thermally-insulated open cold storage chambers for storage of ice and cream; said open cold storage chambers being accessible from both front and rear sides of said cart and being centrally situated between said liquid dispensing units;

a condiment and supply rack mounted above said open cold storage chambers, accessible from both sides of said cart;

a storage compartment within said cabinet for storage of components of said liquid beverages;

drain means within said cabinet structure to receive spillage from said liquid beverage dispensing units;

doors mounted on said front side panel to provide access to the interior of said cabinet structure.

4,076,350

UNIVERSAL RECESSED WALL CABINET

Norman Benjamin Crist, 2135 Clise Place West, Seattle, Wash. 98199

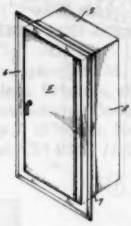
Filed Dec. 29, 1975, Ser. No. 644,431
Int. Cl.[2] A47B *67/00*
U.S. Cl. 312—242 **1 Claim**

1. A universal recessed wall cabinet for installation in a wall structure recess comprising:

a case defining a storage compartment, said case having a substantially rectangular cross section of substantially constant area from front to back of said case, the outer periphery of said case being formed by flat sidewalls including top, bottom and sides for blocking access between said storage compartment and the wall recess, and said case top, bottom and sides having forward coplanar edges defining a planar front opening;

a rectangular mounting frame separate from said case, including four border members arranged orthoginally, each border member being of angle cross section forming an outer flange portion and an inner flange portion, said inner flange portions of said four border members being parallel

to and snugly encircling said case sidewalls and said outer flange portions of said four border members projecting outward from said border member inner flange portions for engagement with an outer face of the wall structure, said inner flange portion of each border member being substantially narrower than the width of said case sidewalls, and said mounting frame and case being relatively slidable for adjustment of said mounting frame toward and away from said case front opening for engagement of said mounting frame border member outer flange portions with the outer margin of the wall structure recess when



said case is installed in such recess with its sidewalls extending inwardly beyond the inner edges of said mounting frame border member inner flange portions; and

securing pins of a length much greater than the combined thicknesses of said case sidewalls and said mounting frame border member inner flange portions for extending from inside said case, through said case sidewalls, through said mounting frame border member inner flange portions and penetrating into the wall structure forming the recess whereby said case and mounting frame are both secured in the wall structure recess by said securing pins.

4,076,351

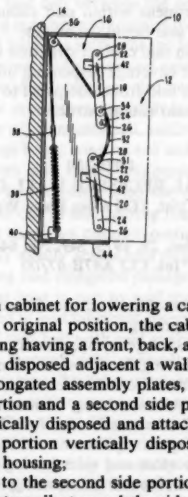
UP-DOWN CABINET

Hobart Dale Wyant, 5303 Delaware, Wichita, Kans. 67204

Filed Apr. 19, 1976, Ser. No. 678,131

Int. Cl.² A47B *67/02*

U.S. Cl. 312—247 **1 Claim**



1. An up-down cabinet for lowering a cabinet and retracting the cabinet to its original position, the cabinet comprising:

a cabinet housing having a front, back, and sides, the back of said housing disposed adjacent a wall;

"L" shaped elongated assembly plates, said plates having a first side portion and a second side portion, the first side portion vertically disposed and attached to the wall, the second side portion vertically disposed and parallel the sides of said housing;

stops attached to the second side portion of said plates and extending outwardly toward the sides of said housing;

upper and lower flange portions attached to and perpendicular to the top and bottom of the first and second side portions of said plates;

upper swing arms and lower swing arms vertically disposed between the sides of said housing and the second side portion of said plates, the lower end of said arms attached to the second side portion of said plates, the upper end of said arms attached to the sides of said housing, said arms resting against said stops when the cabinet is raised in a retracted position, said lower swing arms resting against the lower flange portion of said plates when the cabinet is lowered;

cables having cable pivots attached at one end to said lower swing arms;

first cable pulleys attached to the top of the second side portion of said plates, and second cable pulleys attached to said upper swing arms, said cables riding on said first and second cable pulleys; and

vertically disposed coil springs, the lower end of said springs attached to a spring mounting plate at the bottom of the second side portion of said plates, the upper end of said springs attached to a spring eye, said spring eye attached to the other end of said cables, said coil springs biasing said cabinet in an upward position and adjacent the wall.

4,076,352

SLIDING DRAWER

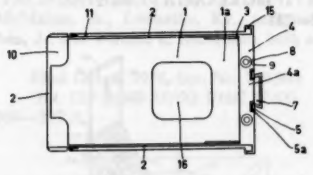
Hans Jürgen Weidner, Nuremberg, and Willi Jüttner, Altenfurt, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 18, 1976, Ser. No. 697,566

Claims priority, application Germany, Jun. 18, 1975, 2527176

Int. Cl.² G09F *19/00*

U.S. Cl. 312—330 R **4 Claims**



1. A sliding drawer, comprising a bottom plate, two side walls and a rear wall connected to the bottom plate, and a front wall connected to the side walls, wherein a portion of the bottom plate which adjoins the front wall is separated from the side walls by slots which extend parallel to the side walls to form a flexible tongue, and the drawer comprises means for locking the tongue in said front wall in a locked condition of the sliding drawer, in an unlocked condition of the drawer the tongue being bent downward from the position of the tongue when locked.

4,076,353

MOUNTING ARRANGEMENTS AND UNITS FOR USE THEREIN

Alan Barlow, Cheltenham, England, assignor to Smiths Industries Limited, London, England

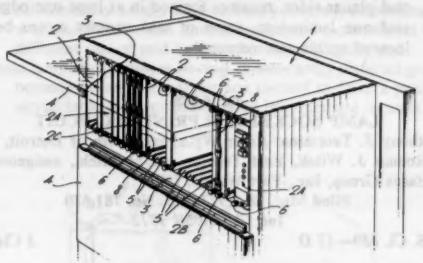
Filed Feb. 25, 1976, Ser. No. 661,221

Int. Cl.² A47B *88/00*; H02B *9/00*

U.S. Cl. 312—350 **4 Claims**

1. A mounting arrangement comprising, a rack including two spaced projections that define a guideway, a unit which is adapted to be slidable into said guideway, means on each said unit for rigidly and non-resiliently locking that unit in its re-

spective guideway by a clamping action that exerts a force against said projections acting generally transverse to the



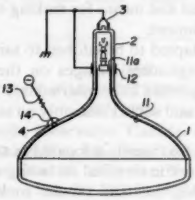
direction of slidable movement of said unit into its respective guideway.

4,076,354

METHOD FOR CONDITIONING AN EDGE OF AN INTERNAL ELECTRIC CONDUCTIVE FILM OF A CATHODE RAY TUBE

Masamichi Wada, Otsu; Isamu Nakagawa, Oumihachiman, and Hiroshi Mizoguchi, Otsu, all of Japan, assignors to Nippon Electric Glass Company, Limited, Japan

Filed Oct. 14, 1976, Ser. No. 732,450
Claims priority, application Japan, Oct. 17, 1975, 50-125532
Int. Cl.[2] H01S *9/00*
U.S. Cl. 316—1 **6 Claims**



1. A method for conditioning an edge of an internal electric conductive film of a cathode ray tube comprising a glass neck tube containing an electron gun, a glass funnel connected with one end of the neck tube, an anode terminal mounted in a side wall of the funnel, the internal electric conductive film being applied on an internal side surface of the funnel and extending to have the edge thereof within the neck tube to give an electrical conduction between an anode electrode of the electron gun and the anode terminal, and stem pins being mounted on the other end of the neck tube for connecting the other electrodes of the electron gun with peripheral circuits, which comprises commonly connecting said stem pins to ground and applying to said anode terminal a negative D.C. voltage high enough to cause cathode spot at said edge of said internal electric conductive film until the edge is conditioned and the electric breakdown strength of the glass neck tube is thereby graded up.

4,076,355

CONNECTOR FOR CONNECTING TOGETHER OPPOSITE SIDES OF A PRINTED CIRCUIT BOARD

Billy Erik Olsson, New Cumberland, and John Philip Kunkle, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 558,864, Mar. 17, 1975, abandoned.
This application May 18, 1976, Ser. No. 687,567
Int. Cl.[2] H05K *1/12*; H01R *13/12*
U.S. Cl. 339—17 C **16 Claims**

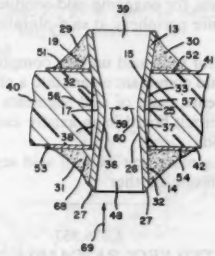
1. In combination, a substrate and a connector for connecting together first and second sides of said substrate having an aperture therethrough and conductive areas adjacent said aperture, with said connector comprising:

a first end section having the general shape of a frustum and extending out of said aperture on said first side of said substrate;

a second end section having the general shape of a frustum and extending out of said aperture on said second side of said substrate;

a sole means for joining together said first and second end sections;

said sole means consisting only of a plurality of beam-like legs extending through said aperture and joining together said first and second end sections;



all of said beam like legs being bowed inwardly towards each other and constructed to be sufficiently flexible to enable said first and second end portions to follow the expansion and contraction of said substrate as the said first and second end portions are soldered to said conductive areas on said substrate and subsequently cooled;

means contacting the inner surfaces of said beam like legs for excluding solder from flowing around said beam like legs; and

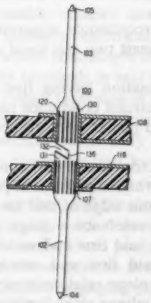
an unobstructed space surrounding said inwardly bowed leg portions during soldering of the end portions to said conductive areas to permit inward and outward movement of said bowed leg portions.

4,076,356

INTERCONNECTION PIN FOR MULTILAYER PRINTED CIRCUIT BOARDS

Peter James Tamburro, Hanover Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 18, 1976, Ser. No. 733,333
Int. Cl.[2] H05K *1/12, 1/14*
U.S. Cl. 339—17 C **17 Claims**



1. A connector for electrically interconnecting multiple conductive layers in a circuit board having at least one aper-

ture therein with electrically conductive material about its periphery including

first and second means for receiving electrically conductive elements,

unitary compliant means, intermediate said first and second means and gradually increasing in cross-sectional thickness from a first end point to a midpoint and thereafter gradually decreasing in cross-sectional thickness from said midpoint to a second end point, for producing a nearly uniform radial pressure on said electrically conductive material on the periphery of said aperture upon the insertion of said connector into said aperture,

means, integral with and abruptly increasing the cross-sectional thickness of an intermediate region along the length of said unitary compliant means at a plurality of discrete radial points, for engaging said conductive material about said aperture periphery at said plurality of discrete radial points,

means, integral with said unitary compliant means, for segmenting said compliant means into a plurality of semiseparate segments, each of said segments engageable with a separate circuit board in an axially assigned stack of such boards, and

said engaging means on each of said segments are radially offset from one another.

4,076,357

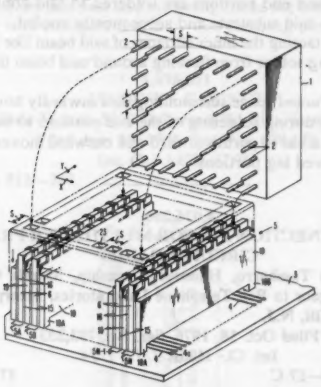
LAMINATED PROGRAMMABLE MICROSTRIP INTERCONNECTOR

Anthony Bartholemew Cistola, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 6, 1976, Ser. No. 747,576

Int. Cl.[2] H05K *1/07, 1/14*

U.S. Cl. 339—17 M **10 Claims**



1. Electrical interconnector apparatus for interconnecting the terminals of at least two electrical devices, said apparatus comprising:

at least one lamination having first and second predetermined printed circuit conductor patterns on the opposing first and second planar sides, respectively, of said lamination,

severable conductor means for connecting said first and second predetermined patterns at predetermined locations across at least one edge of said lamination,

first and second reference voltage plane laminations disposed adjacent said first and second conductor patterns, respectively, said first and second conductor patterns being in signal plane relationships with said first and second reference voltage plane laminations, respectively, in a microstrip manner, and

contact means disposed along at least one laminar edge of said interconnector apparatus adapted to be connectable to said electrical device terminals, said contact means being coupled to predetermined ones of the printed circuit conductors of at least one of said first and second patterns, said one laminar edge being normal to said first and second planar sides, recesses formed in at least one edge of said one lamination, some of said contact means being located within said recesses

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4,076,358

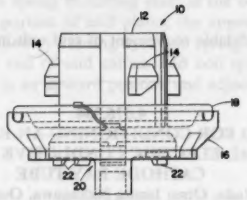
LAMP SOCKET FOR PRINTED CIRCUIT

Anthony J. Taormina; Artur Wyszynski, both of Detroit, and Roman J. Witek, East Trenton, all of Mich., assignors to Essex Group, Inc., Fort Wayne, Ind.

Filed Mar. 28, 1977, Ser. No. 781,620

Int. Cl.[2] H05K *1/12*

U.S. Cl. 339—17 D **2 Claims**



1. A lamp socket assembly adapted to be mounted on one side of a printed circuit with a tubular portion thereof extending through a notched aperture in said printed circuit, which comprises:

a tubular socket portion adapted to receive a light bulb having a filament and means for making electrical connections to said filament;

a base member adapted to be latched to said socket portion;

a plurality of longitudinal flanges on the outside of said tubular socket portion to be inserted into said aperture and twisted to lock said socket assembly on said printed circuit board;

a first unitary electric terminal located in said socket assembly, said first electric terminal including a bulb contacting portion extending into said tubular socket portion and a second portion extending outwardly from said socket portion and adapted to make electrical contact to a first conductor on said printed circuit board;

a second unitary electrical terminal located in said socket assembly, said second electrical terminal including a bulb contacting portion extending into said tubular socket portion and a second portion extending outwardly from said socket portion and adapted to make electrical contact to a second conductor on said printed circuit board;

said first and second unitary electrical terminals being mounted upon said tubular socket portion independently of said base portion; and

integral biasing means on said socket portion for urging said socket assembly away from its locked position.

4,076,359

LAMP SOCKET ASSEMBLY AFFORDING VARIABLE BULB FOCAL LENGTH POSITIONING

Robert Charles Brownlee, Fenton, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 17, 1977, Ser. No. 778,803

Int. Cl.[2] H01R *33/46;* **F21V** *19/02*

U.S. Cl. 339—32 R **8 Claims**

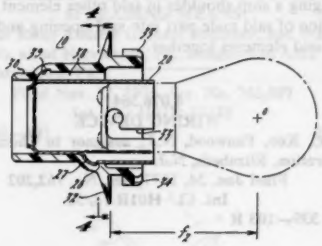
1. A lamp socket assembly providing a selection of several distinct and different bulb socket focal lengths for filament-type lamp bulbs electrically energizable through terminals at the base thereof, said socket assembly comprising

elongated lamp socket means for longitudinally slidably receiving the base of a lamp bulb inserted to a given depth at which it may be energized therein,

a socket housing having a hollow interior for longitudinal slidable reception of said lamp socket means therein,

said socket housing having several arcuately spaced and differentially axially longitudinally located, discontinuous stop shoulder means internally thereof each related to a different one of said bulb socket focal lengths, and

said lamp socket means having an outwardly directed protuberance on an external surface thereof to form a positive unyieldable stop surface located intermediate its ends and



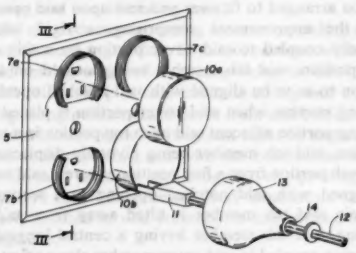
selectively positionable against any one of said several stop shoulder means of said socket housing upon longitudinal slidable insertion of said lamp socket means into said socket housing, whereby the same socket housing and lamp socket means may accomodate and position a lamp bulb so received and inserted in said lamp socket means to any one of several different focal lengths in accordance with which stop shoulder means of said socket housing the stop surface on said lamp socket means is positioned against.

4,076,360

SAFETY DEVICE FOR ELECTRICAL CONNECTOR DEVICE

Dharam Dev Singh, Clearwater, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jun. 21, 1974, Ser. No. 481,676
Int. Cl.² H01R *13/44*
U.S. Cl. 339—36 **4 Claims**



1. A safety device for an electrical connector device of an electrical wall fixture, said safety device comprising

a plate for covering an electrical wall fixture;

a first externally threaded substantially sleeve type device mounted on the plate and surrounding at least part of an electrical connector device of the electrical wall fixture;

a second externally threaded substantially sleeve type device mounted on the plate;

a first internally threaded cap threadedly coupled to the first sleeve type device and covering the electrical connector device when the receptacle is not in use and threadedly coupled to the second sleeve type device when the receptacle is in use; and

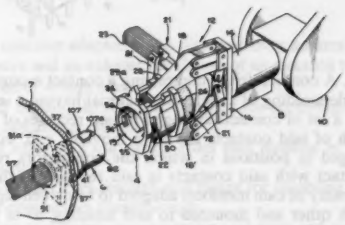
a second internally threaded cap for accommodating an electrical connector plug and threadedly coupled to the first sleeve type device when the receptacle is in use in cooperation with the electrical connector plug.

4,076,361

ELECTRICAL CONNECTOR ASSEMBLY FOR USE WITH REMOTE MANIPULATOR

Robert F. Campbell, Irvine, Calif., assignor to Gulton Industries, Inc., Metuchen, N.J.

Filed Dec. 17, 1975, Ser. No. 641,552
Int. Cl.² H01R *13/54*
U.S. Cl. 339—75 M **17 Claims**

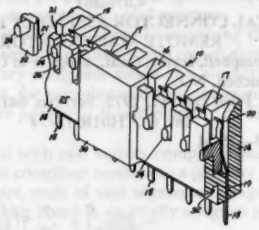


1. Electrical connector apparatus comprising: telescoping inner and outer connector units, said outer connector unit including a housing with a main housing portion having an opening at one end into which said inner connector unit is longitudinally axially movable into said main housing portion of said outer connector unit, one of said connector units having on the end remote from the other connector unit an elbow portion laterally extending therefrom and exposed on at least one side thereof, an outwardly spring-urged means exposed on the outside of the connector unit having said elbow portion and depressible by the jaws of a manipulator brought opposite the apparatus in a direction generally transversely of the longitudinal axis of said outer connector unit opening therein, latch means operated by said depressible means and being normally in a latching position for interlocking with a portion of the other connector unit when the inner connector unit is fully inserted within said outer connector unit to prevent separation of the connector units, and having a release position when said depressible means is depressed a given extent for permitting separation of said connector units, insulated electrical conductors in said inner connector unit, which conductors terminate in longitudinally accessible contact terminals in said inner connector unit, and insulated electrical conductors in said outer connector unit, which conductors terminate in longitudinally accessible contact terminals in said outer connector unit and face toward the contact terminals of said inner connector unit, and make full, proper electrical engagement therewith when said inner connector unit is fully inserted within said opening of said outer connector unit housing and said inner and outer connector units have a given circumferential, angular relationship to one another, and the electrical conductors of the connector unit having said depressible means passing through, and being held in displaced position to one side of the connector unit by said elbow portion thereof to permit a manipulator to be brought into engaging position with said depressible means from the longitudinally, outwardly facing side of the elbow portion of the latter connector unit where the same is depressed to move the latch means to said release position and clamp the connector apparatus therewith for movement thereby to another location.

4,076,362
CONTACT DRIVER

Yoshiaki Ichimura, Akishima, Japan, assignor to Japan Aviation Electronics Industry Ltd., Tokyo, Japan

Filed Feb. 11, 1977, Ser. No. 767,845
Claims priority, application Japan, Feb. 20, 1976, 51-16910; Nov. 1, 1976, 51-131361; May 24, 1976, 51-66389[U]
Int. Cl.[2] H01R *13/54;* H05K *1/10*
U.S. Cl. 339—75 MP 12 Claims

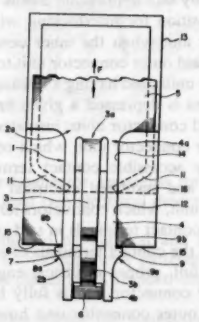


1. A contact driver comprising a contact mount formed as a single molding of a dielectric material having a series of recesses, a set of contacts arranged in said recesses of the molding, each of said contacts having a movable end, conductors arranged in positions in which the conductors remain out of contact with said contacts in said recesses of the molding, a plurality of cam members adapted to be driven separately from each other and mounted to said molding so as to cooperate with said contacts respectively, and a slider longitudinally slidable along said molding whereby to operate said cam members in regular succession so as to move the movable ends of said contacts to relative positions in which the movable ends are in contact with said conductors.

4,076,363
FASTENING AND LOCKING DEVICE

Lucien Leon Péchard, Dole, and Bernard André Logerot, Montbarrey, both of France, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Oct. 13, 1976, Ser. No. 732,016
Int. Cl.[2] H01R *13/54;* H05K *1/12*
U.S. Cl. 339—91 R 2 Claims

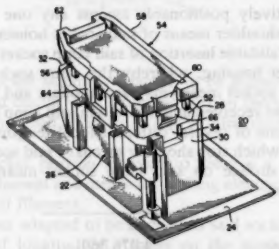


1. A fastening and locking device for securing and locking together two elements, including a male part on one of the elements and a receiving opening in the other of said elements, the improvement wherein said male part comprises three flexible parallel blades having fixed ends connected to a common strap element and separated at their other ends, the middle blade terminating with a T-shaped portion which, in the rest position of the device lies in the plane of the two lateral blades and maintains a predetermined spacing between said two lateral blades, said other end of said middle blade being bendable out of the plane of said two lateral blades so as to move said T-shaped portion from between said lateral blades to allow a pinching together of the lateral blades toward each other, said lateral blades each comprising on their outer edges a locking shoulder which engages with the posterior surface of said receiving opening after insertion of said male part into said opening and said lateral blades return to their rest positions, and said male part further comprising a pair of depending taps which lie in a plane parallel to and spaced apart from said plane of said lateral blades and including inwardly folded portions for engaging a stop shoulder in said other element to limit the penetration of said male part into said opening and to assist in locking said elements together.

4,076,364
WIRING DEVICE

Ted L. C. Kuo, Fanwood, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Jan. 24, 1977, Ser. No. 762,202
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—103 R 5 Claims



1. In an electrical wiring device of the type having, in combination, a housing portion have opposing end walls and opposing sidewalls arranged in a box-like configuration with an open top portion and wherein at least one of said end walls has a notched opening which communicates with said open top portion and has a channeled recess extending within each side edge defining said notched opening, and a generally flat cover portion arranged to fit over and seat upon said open top portion, the improvement comprising: a rigid tab member hingedly coupled to said cover portion by a thin compliant web portion, said tab member being located on said cover portion so as to be aligned with said notched opening in said housing portion when said cover portion is placed over said housing portion adjacent said open top portion in a preselected position, said tab member being pivotally displaceable about said web portion from a first position wherein said tab member is aligned with said notched opening to a second position wherein said tab member is tilted away from said notched opening, said tab member having a central longitudinal axis and being coupled to said cover member along a first axis offset from and parallel to said central longitudinal axis to cause said tab member to be subjected to a pivoting torque upon its contact with an obstruction located within said notched opening, said tab member including a locking shoulder extending outwardly from either side thereof adjacent said web portion and having a length substantially shorter than the length of said tab member, said locking shoulders being dimensioned to engage a respective channeled recess in said notched opening to provide a lock therebetween in the event no obstruction is present in said notched opening and said cover portion is in a substantially fully seated position over said open top portion of said housing portion, said tab member terminating in an extending free end portion opposite said web portion, said free end portion having a rounded edge to facilitate sliding engagement with an obstruction in said notched opening, said free end

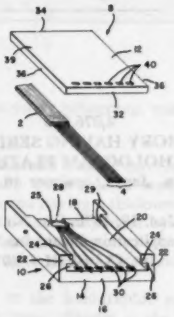
portion being located along said first axis in alignment with said web portion.

4,076,365

ELECTRICAL CONNECTOR HAVING CONDUCTOR SPREADING MEANS

Milton Dean Ross; Andrew Graham Boutcher, and Walter Clifton Shatto, all of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 22, 1976, Ser. No. 743,897
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—107 28 Claims



1. A multi-contact electrical connector which is intended to be installed on an end portion of a multi-conductor cable, said connector comprising:

first and second electrical connector housing parts of insulating material,

said first housing part being generally prismatic and having a mating zone and a cable-receiving end, a cable-receiving surface extending across said first part from said cable-receiving end to said mating zone,

a plurality of conductor spreading recesses extending across said cable-receiving surface from said cable-receiving end to said mating zone, said recesses being in side-by-side parallel relationship at said cable-receiving end and extending along pedetermined paths from said cable-receiving end whereby upon locating said cable on said surface at said cable-receiving end with the conductors of said cable in said recesses and progressively pressing said conductors into said recesses, said conductors will be precisely located in said recesses on said surface in said mating zone,

said second housing part being assemblable to said first housing part and having a cable-engaging surface which is against said cable-receiving surface when said second housing part is assembled to said first housing part,

said first and second housing parts having cooperable guide means thereon for guiding said parts into assembled relationship by guiding said second part over said cable-receiving surface of said first part from said cable-receiving end to said mating zone of said first part whereby upon locating said cable on said cable-receiving surface and assembling said second part to said first part, said conductors are pressed into said recesses during assembly of said second part to said first part and will be precisely located in said mating zone, and

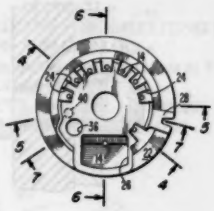
electrical contacting means for establishing electrical contact with said conductors in said mating zone.

4,076,366

HIGH VOLTAGE ELECTRON TUBE BASE WITH SEPARATE DIELECTRIC FILL-HOLE

Myron Henry Wardell, Jr., Lititz, and Bruce George Marks, Lancaster, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed May 18, 1977, Ser. No. 798,127
Int. Cl.[2] H01R *13/46*
U.S. Cl. 339—144 T 9 Claims



1. A base member adapted to be disposed over an array of lead conductors and an exhaust tubulation of an electron tube, said base member comprising:

a. a tubular housing having an open end for receiving said exhaust tubulation therein,

b. a flange extending outwardly from said housing at said open end thereof,

c. an array of apertures through said flange for receiving said array of conductors therethrough,

d. a recess in said flange encompassing said open end and at least one of said apertures, and

e. a passageway in said base member separate from the tubulation receiving cavity of said housing and opening into said recess.

4,076,367

SOLDERLESS CONNECTOR

Jules Avins, Staten Island, N.Y., assignor to Avins Industrial Products Corporation, Staten Island, N.Y.

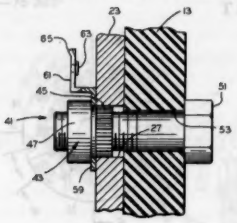
Filed Sep. 9, 1976, Ser. No. 721,872
Int. Cl.[2] H01R *17/18*
U.S. Cl. 339—177 E 15 Claims

1. A coaxial cable connector comprising: a conductive body, contact means for receiving the center conductor of the coaxial cable, insulating means for mounting said contact means in insulating relationship to said body, said body including seating means for the outer conductor of said coaxial cable, conductive plug means including a central aperture for receiving the cable therethrough and integrally including engaging means for freely rotatably and captively mounting a ferrule to one end thereof, means for providing a nonslip interconnection for the wire braid outer conductor of said coaxial cable to secure said outer conductor to said body including a single piece ferrule having integral means engaging said engaging means of said plug for freely rotatably and captively mounting said ferrule to said one end of said plug said ferrule including a surface for engaging the outer conductor of the cable; said body and plug including means for rotatably securing said plug in said body whereby said outer conductor is compressibly secured between said seating means and said ferrule and held stationary therebetween by said ferrule as said plug is rotatably fitted into said body; and means for coupling said body to the body of a mating connector.

4,076,368
TERMINAL FASTENER AND INSTRUMENT TAP

John W. Erickson, Crystal Lake, Ill., assignor to Boltswitch Inc.

Continuation of Ser. No. 396,384, Sep. 12, 1973, abandoned.
This application Mar. 3, 1975, Ser. No. 554,768
Int. Cl.[2] H01R 13/50
U.S. Cl. 339—214 R 2 Claims



1. A combination switch terminal fastener means and instrument tap for a high amperage bolted pressure contact switch of the type comprising an insulator base and having switch terminals of hard copper with each switch terminal having a flange abutting said insulator base, and a smooth-walled mounting aperture extending through said flange, said fastener means and instrument tap including:

a cylindrical steel insert, having a knurled portion press-fit into said mounting aperture of said switch terminal flange, and an enlarged head portion incapable of being inserted into said mounting aperture, said enlarged head portion having a radially extending end surface facing the terminal flange, and a threaded hole extending axially of said cylindrical insert;

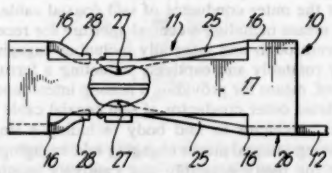
an instrument connection terminal having a flat base portion engaged and held in firm electrical contact with said switch terminal flange by said radially extending end surface of said insert head portion and an offset portion including means for attachment to an electrical instrument; and

a bolt extending through said insulator base and engaging said threaded hole of said cylindrical insert to mount said switch terminal flange on said insulator base and to afford increased contact pressure between said instrument connection terminal and said switch terminal flange.

4,076,369
BOX TERMINAL FOR CARD EDGE RECEPTACLES IN TELECOMMUNICATIONS SYSTEMS AND THE LIKE

Harold Joseph Ostapovitch, Lachine, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jul. 26, 1976, Ser. No. 708,628
Int. Cl.[2] H01R 13/12
U.S. Cl. 339—258 R 5 Claims



1. A box terminal, for reception of a rectangular terminal pin, including a main body box portion and a tail portion;

the main body portion of elongate form having a rectangular cross-section normal to the longitudinal axis, and including an entry end and an exit end, said tail portion extending from said exit end;

said main body portion having four side members forming first and second pairs of side members, the side members of a pair in opposition;

the first pair of side members being cantilevered from the exit end and resiliently biased inwardly to form cantilever spring contact members, each having a free end extending towards said entry end, and a domed contact area adjacent to the free end of each spring contact member;

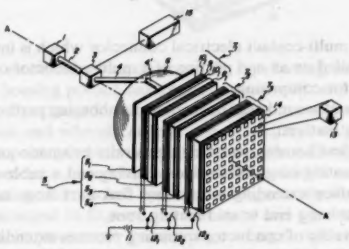
means restricting inward deflection of said spring contact members to provide a preloaded bias on said contact members; and

the second pair of side members deformed inwardly intermediate the ends of the side members to form said pin engaging formations, each formation including an inwardly inclined surface positioned toward said entry end.

4,076,370
OPTICAL MEMORY HAVING SERIALLY STOCKED HOLOGRAM PLATES

Shoji Wako, Ebina, Japan, assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 19, 1976, Ser. No. 650,226
Claims priority, application Japan, Jan. 24, 1975, 50-9808
Int. Cl.[2] G03H 1/30
U.S. Cl. 350—3.75 6 Claims



1. An optical memory device comprising:

means for generating a scanning light beam,

a first hologram plate adjacent said generating means and transparent except for an array of sub-holograms arranged in spaced relationship on said plate,

means for positioning said scanning light beam to irradiate a selected portion of said first hologram plate;

a second hologram plate adjacent said first hologram plate and transparent except for an array of sub-holograms arranged in spaced relationship on said plate, said first and second hologram plates being arranged in serial alignment in the direction of light propagation of said scanning light beam and in a horizontally registered relation to one another,

a light beam deflector interposed between said first and second hologram plates,

means coupled to said light beam deflector for causing the scanning light beam which is transmitted through a selected transparent portion of said first hologram plate to be deflected by said light beam deflector so the scanning light beam irradiates a selected portion of said second hologram plate, and

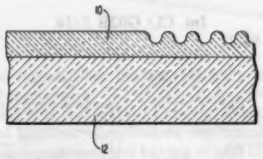
detecting means for reading a selected one of said sub-holograms irradiated by said scanning light beam.

4,076,371

HOLOGRAPHIC RECORDING MATERIAL FOR INFRARED RADIATION

Werner Braun, Munich; Gernot Decker, and Horst Röhr, both of Garching, all of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Division of Ser. No. 484,698, Jul. 1, 1974, abandoned. This application Aug. 12, 1976, Ser. No. 713,832
Claims priority, application Germany, Jul. 2, 1973, 2333554
Int. Cl.[2] B05D *3/06*
U.S. Cl. 350—3.61 3 Claims



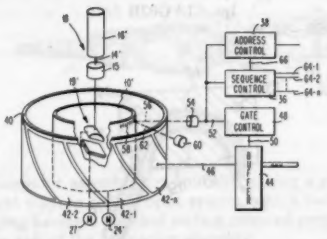
1. A method for recording holograms, comprising the steps of:
providing a substrate:
providing on said substrate a single layer, said layer consisting of substantially pure gelatin capable of absorbing infrared radiation and having a thickness which is greater than the change in thickness caused by the contemplated exposure to the infrared radiation;
generating a holographic pattern using infrared laser radiation; and
exposing the layer to the holographic patterned infrared laser radiation to cause changes in the optical thickness thereof.

4,076,372

TWO-DIMENSIONAL LIGHT DEFLECTOR APPARATUS

Robert Vladimir Pole, Los Gatos, Calif., and Hans Peter Wollenmann, Rueti, Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 643,891, Dec. 23, 1975, abandoned. This application Apr. 28, 1977, Ser. No. 791,821
Int. Cl.[2] G02B *27/17*
U.S. Cl. 350—6.9 14 Claims



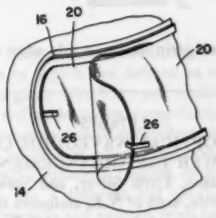
1. A holographic light deflector apparatus comprising:
a cylindrical member having a plurality of holograms recorded on a surface thereof, each of said holograms when reconstructed producing a line image on a cylindrical image surface, with each line being at an angle with respect to the plane containing the base of said cylindrical member;
optical means for producing and directing a beam of light toward said cylindrical member, said beam of light being shaped to illuminate a small area of said holograms and being shaped to produce more convergence in the direction of said line image so as to reconstruct a point image;
means for rotating said cylindrical member about its axis at a constant high speed so that the resulting reconstructed point image is deflected in a direction perpendicular to said line image; and
means for rotating said optical means about the axis of said cylindrical member so that said reconstructed image point is capable of scanning the entire cylindrical image surface.

4,076,373

METHOD OF AND MEANS FOR SHIELDING THE LENS OF A FACE MASK

Anthony L. Moretti, San Rafael, Calif., assignor to E. D. Bullard Company, Sausalito, Calif.

Filed Mar. 10, 1976, Ser. No. 665,691
Int. Cl.[2] G02B *7/00;* G02C *3/02*
U.S. Cl. 350—61 11 Claims



1. Means for shielding the exterior surface of the protective lens of a face mask comprising:
a. a plurality of thin flexible sheets of material each of which is capable of transmitting at least some light with each said sheet having given length and width dimensions large enough to cover the usable optical area of said exterior surface of said protective lens and with each said sheet having an elongated flexible tab projecting from the edge thereof, said plurality of said thin flexible sheets having said length and width dimensions thereof arranged in a mutually aligned stack having its bottom sheet against said exterior surface of said protective lens with said tab of each said sheet bent to extend generally along the top surface thereof and with said tab of each said sheet except the top sheet of said stack received between such sheet and the bottom surface of the sheet adjacent thereto in said stack; and
b. means removably mounting said stack of said plurality of said thin flexible sheets against said exterior surface of said protective lens, said means being active at a limited area only along substantially the entire periphery of the edge of said stack of said plurality of thin flexible sheets.

4,076,374

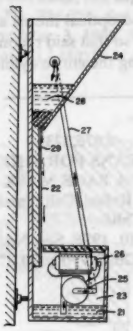
MEANS FOR MAINTAINING VISIBILITY IN THE USE OF MIRRORS SUBJECT TO AQUEOUS DEPOSITS

Robert E. Schwab, 16 Ivy Trail, Greenville, S.C. 29607

Filed Jul. 14, 1976, Ser. No. 705,255
Int. Cl.[2] G02B *5/08;* E06B *7/12;* A47L *1/00;* B08B *3/00*
U.S. Cl. 350—63 4 Claims

1. Means including a surface-coating device and a mirror member having an exposed exterior surface and an upper edge inclined toward said surface, for preventing obscuration of an image due to condensation of vapor and splashing of water on the exposed surface of said mirror member, and including means for applying water to an upper level of said surface while in vertical position and for forming a flowing film of water on said surface, means for withdrawing water from said film at a lower level of said surface, means for returning the

water to said water-applying means at said upper level, a strip of sponge material adjacent said water-applying means at said



upper level, the said strip having a side edge against the edge of said member.

4,076,375

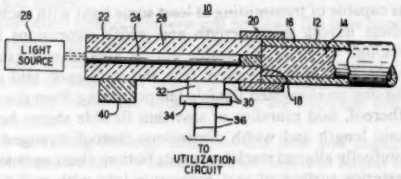
DIRECTIONAL OPTICAL WAVEGUIDE COUPLER AND POWER TAP ARRANGEMENT

Willis Martin Muska, Little Silver, and Stewart David Personick, Middletown, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 24, 1975, Ser. No. 644,304

Int. Cl.[2] G02B 5/14

U.S. Cl. 350—96.15 7 Claims



1. A directional optical waveguide coupler and power tap capable of coupling core-guided modes propagating in a first direction out of a transmission optical waveguide and avoiding loss of core-guided modes which may be propagating in a second direction, the transmission optical waveguide including a core surrounded by a layer of cladding material having a refractive index which is less than the refractive index of the core material, the directional coupler and power tap comprising

a second optical waveguide comprising a core having a given refractive index surrounded by a layer of cladding material having a refractive index which is less than the refractive index of said second waveguide core material, the core of said second waveguide having a cross-sectional area which is significantly smaller than the cross-sectional area of the core of the transmission waveguide, and one end of said second waveguide being abutted with an end of the transmission waveguide in a manner to permit a significant amount of the core-guided modes propagating in the first direction in the transmission waveguide to be coupled into the cladding layer of said second waveguide at said abutting point and to permit core-guided modes introduced at the other end of said second waveguide and propagating in a second direction in said second waveguide to be coupled primarily into the core of the transmission waveguide at said abutting point, and

means disposed at a first intermediate position along the peripheral surface of said second optical waveguide capable of coupling out of the cladding layer of said second waveguide the cladding modes coupled therein primarily from the core of said transmission waveguide for subsequent conversion to a representative electrical signal.

4,076,376

OPTICAL TRANSMISSION SYSTEMS

Raymond Jeffrey Slaughter, Chislehurst, England, assignor to BICC Limited, London, England

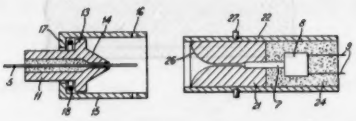
Continuation of Ser. No. 514,395, Oct. 15, 1974, abandoned.

This application Feb. 2, 1976, Ser. No. 654,524

Claims priority, application United Kingdom, Oct. 16, 1973, 48096/73

Int. Cl.[2] G02B 5/14

U.S. Cl. 350—96.21 6 Claims



1. For use in an optical transmission system, an optical fibre connector comprising two separately formed bodies, one body of the connector having a bore for housing one of two optical fibres to be detachably connected end-to-end and the other body of the connector having a throughbore which is stepped between its ends the part of said stepped throughbore that will be nearer said first body when the two bodies are detachably connected together being of the same cross-sectional shape and size as the bore of said first body.

4,076,377

FIBER-OPTIC DEVICE WITH CURVED SLEEVE AND FILLER MATRIX

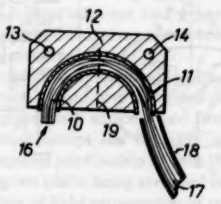
Nando Moraschetti, Bergdietikon, Switzerland, assignor to Volpi AG, Urdorf, Switzerland

Filed Feb. 5, 1976, Ser. No. 655,572

Claims priority, application Switzerland, Feb. 19, 1975, 2091/75

Int. Cl.[2] G02B 5/16

U.S. Cl. 350—96.25 9 Claims



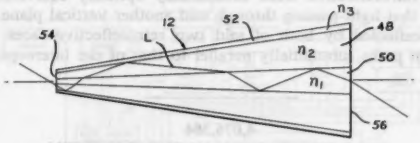
9. In a fiber-optic cable comprising a fiber bundle and at least one socket-type end portion, the improvement of said end portion comprising a curved tubular member rigidly enclosing a portion of said fiber bundle in a closely packed arrangement and embedded in a solid matrix formed of a set lubricant, said curved tubular member having a first end and a second end, said matrix comprising from said first end of said tubular member to a midpoint between the ends thereof an epoxy resin and from said second end of said tubular member to the midpoint between the ends thereof a cured silico-organic compound.

4,076,378

TAPERED FIBER OPTIC ARRAY

Henry B. Cole, East Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Mar. 8, 1976, Ser. No. 664,726
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.24 4 Claims



3. A tapered optical fiber having relatively large and small opposite ends comprising:

a core having first and second concentric similarly tapered and joined together components, the first of said components being centermost and having at said large end of said fiber a light transmitting face of an area size substantially less than that of said large end of said fiber and being of a higher refractive index than said second concentric component; and

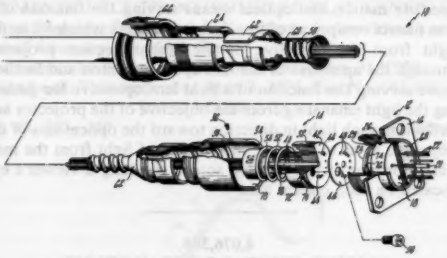
a relatively thin cladding of material of lower refractive index than said second core component surrounding and joined to said multiple component core for rendering said fiber internally reflective to light, the refractive index differential of said first and second core components and their taper ratio being selected according to the numerical aperture output and magnification desired of said fiber.

4,076,379

FIBER OPTIC CONNECTOR

Rene Joseph Chouinard, Andover, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 26, 1976, Ser. No. 708,679
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.22 13 Claims



1. A connector assembly for optically joining a pair of opposing light ways in a fiber optic system, which includes:

a first plug having a polished surface oriented perpendicular to the axis of the connector assembly;

a first light way having an end which is flushly embedded in the polished surface of said first plug;

a second plug having a polished surface which is oriented perpendicularly to the axis of the connector assembly and which faces the polished surface of said first plug;

a second light way having an end which is flushly embedded in the polished surface of said second plug;

a pair of alignment pins which extend perpendicularly from said polished surface of the second plug into engagement with said first plug wherein at engagement the light way of the first plug is aligned with the light way of the second plug; and

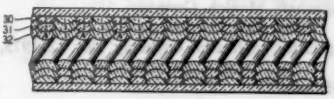
a flat spacer element disposed between said polished surface of the first plug and said polished surface of the second plug the spacer having a plurality of orifices which are located to axially separate the ends of the light ways.

4,076,380

GRADED INDEX OPTICAL FIBER

Frank Vincent DiMarcello, Clinton Township, Hunterdon County, and John Charles Williams, Whippany Township, Morris County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 28, 1976, Ser. No. 736,398
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.31 5 Claims



1. An optical fiber with a transmitting core, the refractive index properties of which are defined in terms of coaxially nested tubular regions which do not necessarily correspond with physically definable layers, comprising:

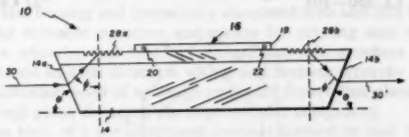
a core with a cross section of nonuniform index of refraction, the tubular regions of which core comprise at least two approximately continuous regions, each of which continuous regions has a different but approximately constant index of refraction and extends from one end of the fiber to the other end describing a helix whose axis is approximately collinear with the fiber axis, each of the tubular regions thereby having periodic longitudinal variations in index of refraction of period between 0.1 and 400 meters, the longitudinal variations in index of refraction of each tubular region being in approximate antiphase relation with the longitudinal variations in index of refraction of the tubular regions adjoining it, and the minimum index of refraction of each tubular region being approximately equal to the maximum index of refraction of the next adjacent tubular region of larger radius.

4,076,381

ON LINE ELECTRO-OPTIC MODULATOR

Jacob Meyer Hammer, Plainsboro, N.J., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 1, 1976, Ser. No. 737,807
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.14 5 Claims



1. An electro-optic modulator device comprising:

a waveguide film having substantially parallel plane surfaces and characterized by electro-optic properties;

first and second gratings formed in one of said plane surfaces of said waveguide and adjacent opposite ends thereof;

electrode means, disposed against said one of said plane surfaces of said waveguide film between said first and second gratings, for subjection of said waveguide film to varying electrical fields;

a prismatic refractive substrate having a plane surface disposed against the other of said plane surfaces of said waveguide, said substrate having opposite plane end faces disposed at pedetermined angles to the longitudinal axis of

said substrate, whereby a beam of light travelling along a predetermined entry axis parallel to said parallel plane surfaces and entering said substrate through one of said end faces is refracted to impinge on said first grating so as to be propagated within said waveguide film toward said second grating by which the light is directed to said second end face for refraction and exit from said substrate along an exit axis that is aligned with said entry axis.

4,076,382
OPTICAL CABLE WITH PLASTIC MULTILAYER SHEATH

Ulrich Oestreich, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 11, 1976, Ser. No. 741,124
Claims priority, application Germany, Nov. 12, 1975, 2551211
Int. Cl.² G02B *5/16*
U.S. Cl. 350—96.23 **3 Claims**

1. In an optical cable of the type comprising a cable core containing optical transmission elements and a multilayer sheath surrounding the cable core made of plastic with an outer layer of polyvinylchloride, the improvement comprising:

a. a layer of thermpolastic polyurethane disposed between the outer layer of polyvinylchloride and the cable core;

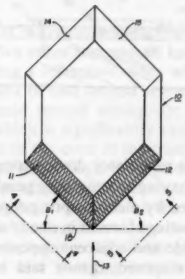
b. a first serving of filaments of an aromatic polyamide disposed between said cable core and said polyurethane; and

c. a second serving of filaments of an aromatic polyamide arranged between said outer layer of polyvinylchloride and said polyurethane.

4,076,383
MULTI-SIDED RETROREFLECTOR

James H. Heasley, Shaker Heights, Ohio, assignor to Ferro Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 635,634, Nov. 26, 1975. This application Jan. 26, 1976, Ser. No. 652,236
Int. Cl.² G02B *5/124*
U.S. Cl. 350—103 **21 Claims**

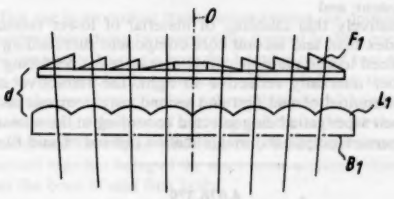


1. A multi-sided retroreflective body having at least two retroreflective substantially planar faces adapted to intercept light that is to be retroreflected, each face having a predetermined angular relationship with the other and each containing a plurality of light-reflecting units, each unit comprising three mutually perpendicular surfaces, each of said at least two retroreflective faces being tilted in the same general direction about a lower portion angularly away from a vertical plane and being angularly related in a horizontal plane with respect to another vertical plane disposed substantially at right angles to the direction of said light to define said angular relationship, all four of said angles being so interrelated as to make said at least two retroreflective faces substantially optically equivalent, such that light passing through said another vertical plane is retroreflected by both of said two retroreflective faces in return paths substantially parallel to that of the intercepted light.

4,076,384
REAR-PROJECTION VIEWING SCREEN

Reinhold Deml, Munich; Ulrich Greis, Weyarn; Wilfried Hofmann, Taufkirchen, and Walter Rauffer, Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 27, 1976, Ser. No. 680,877
Claims priority, application Germany, May 2, 1975, 2519617
Int. Cl.² G03B *21/56*
U.S. Cl. 350—122 **10 Claims**



1. A rear-projection viewing screen operative for receiving light incident upon its back side from the objective of a rear-projection projector and forming a corresponding image visible to a human eye viewing the front side of the viewing screen, the rear-projection viewing screen comprising a lens-aperture matrix; and optical means serving the function of a lens matrix comprised of lens-matrix elements which focus the light from the objective of the rear-projection projector through the apertures of the lens-aperture matrix and furthermore serving the function of a field lens operative for gathering the light emanating from the objective of the projector and deflecting such light in direction toward the optical axis of the objective so as to increase the amount of light from the marginal portions of the viewing screen reaching a viewer's eye located on such optical axis.

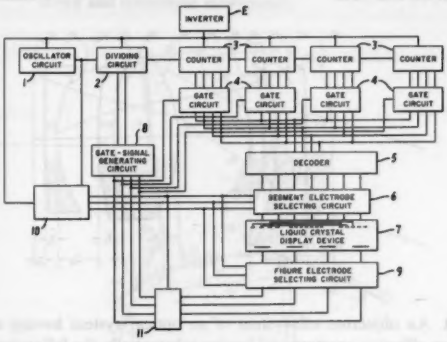
4,076,385
LIQUID CRYSTAL DISPLAY DEVICE

Kenichi Kondo, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Aug. 14, 1975, Ser. No. 604,783
Claims priority, application Japan, Aug. 14, 1974, 49-93069; Sep. 4, 1974, 49-101483
Int. Cl.² G02F *1/18*; G08B *5/36*
U.S. Cl. 350—332 **3 Claims**

1. A liquid crystal display device comprising in combination: a liquid crystal display having a plurality of segment electrodes positioned to define a plurality of display figures; a divider for dividing a time-standard signal; a plurality of counters for counting the output of said divider; a gate circuit for transmitting the output signal of said counters in a time-sharing mode; a gate signal generator circuit for generating a gate signal and for applying the same to said gate circuit to control the operating mode of said gate circuit; a decoder for receiving the counter output signal transmitted through said gate circuit and for decoding the same to develop segment signals for enabling

said segment electrodes; a segment electrode selecting circuit and a figure electrode selecting circuit each comprising a transmission gate to which the output signal of said decoder and said gate signal are applied as a control signal, each of the transmission gates comprising said selecting circuits respectively receiving a voltage higher than a threshold voltage of



said liquid crystal display and a voltage lower than the threshold voltage, said transmission gates being connected so that the higher voltage is applied to the selected segment electrode alternately and the lower voltage is applied to the non-selected segment electrode whereby the display of each of the figures are driven by said gate-signal in the time sharing mode.

4,076,386

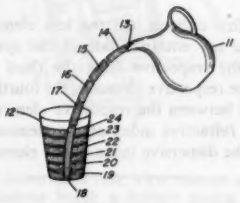
SEGMENTED ELECTROCHROMIC DISPLAY GENERAL

Robert Domenico Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 411,575, Oct. 31, 1973, abandoned. This application Mar. 3, 1976, Ser. No. 663,402

Int. Cl.² G08B *5/36*

U.S. Cl. 350—357 **6 Claims**



1. A variable information display device which comprises a light transmitting substrate having multiple separate discrete segments of persistent electrochromic material as a light modulating medium, a common counter electrode, and a common layer of an ion conducting material in contact with said electrochromic material and said counter-electrode, said segments being arranged so as to display variable animated pictorial arrangements when selected segments are in a bleached or colored state, electrode means connected to each segment, and an electrical source to power each segment selectively so as to display desired arrangements.

4,076,387

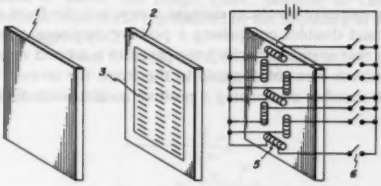
MAGNETIC DISPLAY

Werner E. L. Haas, Webster, and Gary A. Dir, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 2, 1976, Ser. No. 702,270

Int. Cl.² G02F *1/36*

U.S. Cl. 350—362 **12 Claims**



1. A magneto-optic display comprising a layer of composition comprising a ferrofluid and metal flakes said layer of composition sandwiched between two magnetic field permeable substrates, one of said substrates being optically transparent and the other of said substrates having at least one selectively energizable electro-magnet affixed thereto.

4,076,388

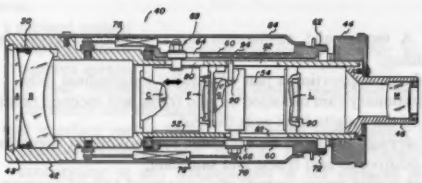
ZOOM LENS ASSEMBLY

Harold F. Bennett, Pasadena, and Wai-Min Liu, Arleta, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 516,299, Oct. 21, 1974, abandoned, which is a division of Ser. No. 408,777, Oct. 23, 1973, Pat. No. 3,901,585. This application Apr. 19, 1976, Ser. No. 678,288

Int. Cl.² G02B *15/18*

U.S. Cl. 350—187 **4 Claims**



1. In a variable magnification optical system having a housing, first and second movable lens members arranged on a common optical axis within said housing, a cam sleeve coaxial with said housing and operatively associated with said first and second movable members and means for rotating said cam sleeve whereby said first and second movable members are moved on an axial direction within said housing whereby the magnification level of an image projected from a first plane to a second plane is varied, the improvement comprising:

cam slots of a predetermined contour formed on said cam sleeve, said predetermined contour being selected whereby equal increments of rotation of said cam sleeve causes said first and second movable members to be axially positioned within said housing such that the magnification level is changed in equal increments for each corresponding incremental rotation of said cam sleeve, and

first and second fixed lens members arranged on said common optical axis, the arrangement of said lens members from the front to the rear comprising said first fixed lens member, said first movable lens member, said second movable lens member and said second fixed lens member, the first fixed lens member comprising, from the front to the rear, a double convex element and a negative meniscus element convex to the front, the axially movable first lens member comprising, from the front to the rear, a positive

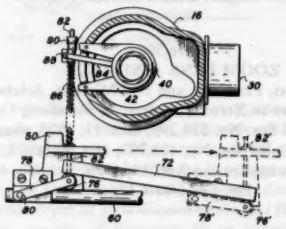
meniscus element convex to the front, a doublet comprising a double convex element, the rear surface of which is affixed to a first double concave element, and a second double concave element, said second movable lens member comprising, from the front to the rear a negative meniscus element convex to the front, a first double convex element; a first doublet comprising a second double convex element the rear surface of which is affixed to a first negative meniscus element concave to the front and a second doublet comprising a positive meniscus element, the rear surface of which is affixed to a second negative meniscus element concave to the front, the second fixed lens member comprising a positive meniscus element.

4,076,389

ZOOM LENS MOUNT AND MECHANISM

Edward C. Bock, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 29, 1976, Ser. No. 681,371
Int. Cl.[2] G02B *15/00, 9/00, 7/02*
U.S. Cl. 350—187 **8 Claims**



1. A mount and mechanism for a compound zoom lens including:

a frame supporting a pair of parallel longitudinal rails,

a stationary cam mounted on said frame and inclined relative to the longitudinal rails thereof,

a carriage mounted on said rails for movement therealong relative to said frame and said cam,

first motor means operatively connected to said carriage to effect movement thereof along said rails,

a lens housing defining a lens aperture on an optical axis and mounted on said carriage for movement therewith, said lens housing supporting a pair of drive shafts extending parallel to said optical axis,

a first lens holder to support a lens element and operatively connected to one of said drive shafts for axial movement within said housing,

a second lens holder to support a lens element and operatively connected to the other of said drive shafts for axial movement within said housing,

said drive shafts being operatively connected to a second motor means for movement in opposite directions relative to each other so that said lens holders move in opposite directions within said housing,

an iris diaphragm operatively connected to said lens housing and disposed about the aperture thereof to define an adjustable lens aperture stop, said iris diaphragm operatively connected to a diaphragm linkage to open and close said iris diaphragm,

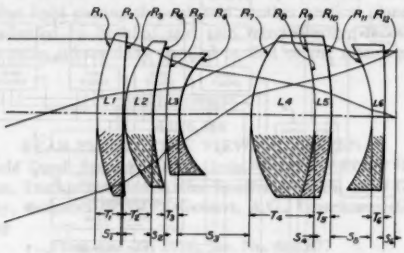
said diaphragm linkage including a cam follower in operative engagement with said stationary cam so that said diaphragm linkage is responsive to the longitudinal position of said carriage relative to said frame to determine the adjustment of said iris diaphragm.

4,076,390

OBJECTIVE FOR OPTICAL SYSTEM

Andor A. Fleischman, Northbrook, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 7, 1976, Ser. No. 748,353
Int. Cl.[2] G02B *9/60, 1/00*
U.S. Cl. 350—216 **1 Claim**



1. An objective sub-system of an optical system having a large effective aperture and having substantially the following specification:

TABLE 1

EFL = 1.0471 inches (26.60mm)
Half Angle of Field = 18.69 degrees

Lens	Radii		Thickness	Spacing	N_D	V
L_1	R_1 =	1.0150				
			T_1 = .1300		1.734	51.7
	R_2 =	−7.3470				
				S_1 = .0050		
L_2	R_3 =	0.5507				
			T_2 = .1420		1.734	51.7
	R_4 =	−1.1810				
				S_2 = .0680		
L_3	R_5 =	2.4000				
			T_3 = .0600		1.805	25.4
	R_6 =	−0.4085				
				S_3 = .3690		
L_4	R_7 =	0.7000				
			T_4 = .3260		1.734	51.7
	R_8 =	1.0700				
				S_4 = —0—		
L_5	R_9 =	−1.0700				
			T_5 = .0800		1.805	25.4
	R_{10} =	1.3100				
				S_5 = .2050		
L_6	R_{11} =	−0.5800				
			T_6 = .0600		1.805	25.4
	R_{12} =	3.9260				
				S_6 = .0491		

wherein the first column lists the lens elements numerically starting at the ray entrance side of the system; the second column lists the respective radii; the third column lists the thickness of the respective elements; the fourth column lists the axial spacings between the respective elements; the fifth column lists the refractive index of the elements; and the sixth column lists the dispersive index of the elements.

4,076,391

MAGNIFYING READING DEVICE AND VIEWER

Sidney Teiser, Portland, Oreg., and Floyd H. Eliott, 2015 SE. 11th Ave., Portland, Oreg. 97214, assignors to Floyd H. Eliott and Barbara Ann Eliott, both of Portland, Oreg.

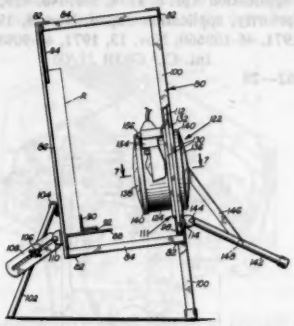
Continuation-in-part of Ser. No. 700,464, Jun. 28, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 741,555
Int. Cl.[2] G02B *27/02, 7/00*
U.S. Cl. 350—241 **2 Claims**

1. A reading device comprising

a. a body member having forward and rearward ends and top and bottom portions,

b. a reading material holder on said body member adjacent the rearward end thereof,

c. a carriage on said body member having a movable support frame adjacent the forward end of said body member,
d. magnifying means on said support frame,
e. said carriage being movable transversely on said body member and said support frame being movable up and down on said carriage to view through said magnifying means an area larger than the latter by combined up and down and transverse movements,



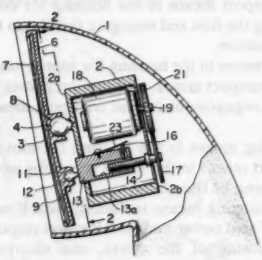
f. a handle pivotally connected at one of its ends to said carriage,
g. and a link pivotally connected between said handle and said movable frame whereby said support frame is movable to raised and lowered positions by pivotal adjustment of said handle.

4,076,392

REMOTELY CONTROLLABLE REAR VIEW MIRROR

Toshiyuki Suzuki, Yaizu, and Fumio Yamauchi, Shizuoka, both of Japan, assignors to Murakami Kaimedio Co., Ltd., Japan

Filed Jun. 2, 1976, Ser. No. 692,086
Claims priority, application Japan, Nov. 26, 1975, 50-160697[U]
Int. Cl.² G02B *5/08*; A47G *1/24*
U.S. Cl. 350—289 **6 Claims**



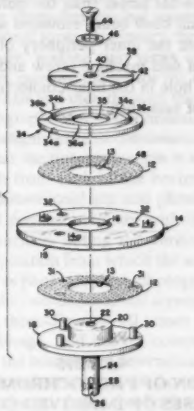
1. A remotely controlled rear view mirror comprising, in combination, a mirror hood; a hollow casing fixed in said mirror hood and having a universal pivotal support on the outer surface thereof on the hood opening side; a rear view mirror within said mirror hood, facing the opening of said mirror hood, and carried by said universal pivotal support; a drive motor having electrically connected thereto a remote control device for operation by a driver, said drive motor fixed within said casing and including an output shaft extending in a direction opposite to said hood opening side; a block disposed within said casing in an axially movable arrangement with its axis of movement parallel to said output shaft; a universal pivot attached to said block and in engagement with said rear view mirror; a pin coupled to said block; a first gear fixedly carried by said pin; a second gear fixed to said output shaft and engaging said first gear; and means for converting rotation of said pin to axial movement of said block; whereby upon activation of said drive motor, said mirror is swung by said universal pivot about said universal pivotal support.

4,076,393

THERMAL STRESS-RELIEVING COUPLING MEMBER AND SUPPORT

Richard L. Bates, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 15, 1975, Ser. No. 640,517
Int. Cl.² G02B *7/00*
U.S. Cl. 350—318 **7 Claims**



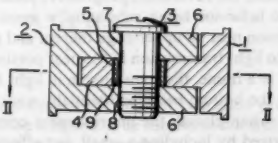
1. A holder for a fragile element subject to large temperature differential environment having a low tolerance to mechanical stress;
a support means;
clamping means for securing the fragile member to said support means;
high heat conducting interface means positioned between the means and the member;
said interface means being a thin metal sheet having compressive crushable and resilient properties capable of conforming to any irregularities in the surfaces of the adjacent means;
whereby the fragile member can be maintained under a predetermined pressure with the interface means conforming to and applying a uniform pressure over the surface of the fragile member.

4,076,394

HINGES FOR A SPECTACLE FRAME

Iwao Nakamura, Sabae, Japan, assignor to Taiko Optical Kyogyo Kumiai, Sabae, Japan

Filed May 27, 1976, Ser. No. 690,582
Claims priority, application Japan, Sep. 17, 1975, 50-128263[U]
Int. Cl.² G02C *5/22*
U.S. Cl. 351—153 **3 Claims**



1. A hinge for a spectacle frame comprising a stationary member having at least two interconnecting elements project-

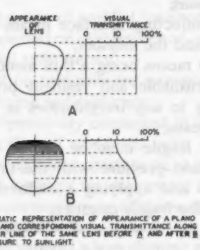
ing therefrom, a swingable member having at least one interconnecting element projecting therefrom and respectively introduced into the respective gaps formed between adjoining sets of said interconnecting elements of said stationary member, a machine screw inserted from the above in aligning holes formed in each of said interconnecting elements of said stationary and swingable members and screwed in the undermost one of said interconnecting elements of said stationary member, and at least one bush rotatably mounted in the hole formed in said at least one interconnecting element of said swingable member, the inner diameters of each of said holes being respectively made somewhat larger than the outer diameter of said machine screw, and the inner diameter of said at least one bush being made somewhat larger than the outer diameter of said machine screw said bush being mounted so as to leave small clearances between the inner periphery of said bush and the outer periphery of said machine screw and between the inner periphery of said hole in the inter-connecting element and the outer periphery of said bush.

4,076,395

PREPARATION OF PHOTOCHROMIC GRADIENT LENSES OF IMPROVED COLOR

Emil W. Deeg, Woodstock, Conn., and David A. Krohn, Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Mar. 18, 1976, Ser. No. 668,172
Int. Cl.² G02C 7/10; G02B 5/23
U.S. Cl. 351—165 **4 Claims**



SCHEMATIC REPRESENTATION OF APPEARANCE OF A PLANO LENS AND CORRESPONDING VISUAL TRANSMITTANCE ALONG CENTER LINE OF THE SAME LENS BEFORE A AND AFTER B EXPOSURE TO SUNLIGHT.

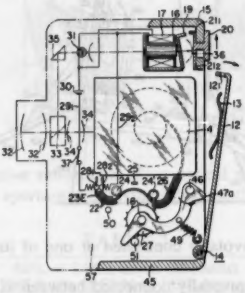
1. In ophthalmic quality lenses and lens blanks exhibiting local reversible, progressive variation in phototropic behavior, said lenses and lens blanks including a portion ultimately to serve as a distance portion and another portion ultimately to serve as a near portion, the distance portion and the near portion to be continuous with the near portion being below the distance portion when a lens made from a said lens blank is glazed in a frame, the reversible, progressive local variation in photochromic behavior being substantially more resistant to light transmission near an upper edge thereof and substantially less resistant to light transmission in the near portion when said lens is glazed in a frame, the transmission in light from the top of the lens to the bottom being substantially uniform laterally of a said lens when glazed, the improvement comprising said lens characterized by including a small, but effective, amount of manganese oxide to thereby provide a lens characterized by a slight blue-yellow color in the unexposed state to a gray color in the exposed state.

4,076,396

CINECAMERA EQUIPMENT CAPABLE OF SYNCHRONOUS SOUND RECORDING

Yoshio Komine; Hiroshi Furukawa, both of Tokyo; Kiyoshi Takahashi, Kunitachi; Tomoshi Takigawa, Machida; Mitsutoshi Ogiso, Kawasaki, and Toshikazu Ichiyanagi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 304,496, Nov. 7, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 459,220
Claims priority, application Japan, Nov. 8, 1971, 46-88891; Nov. 11, 1971, 46-108660; Nov. 13, 1971, 46-90985
Int. Cl.² G03B 23/06
U.S. Cl. 352—29 **10 Claims**



1. A motion picture camera usable with a film magazine containing a roll of sound signal recordable photographic film comprising:

a housing forming a chamber adapted to receive said magazine:

a cover mounted on the housing which is openable and closable with respect to the chamber for closing the chamber;

recording means in the housing for recording the sound signals on said film, said recording means being adapted to engage the film for sound recording at a position in the path of the film on which sound recording is effected;

film transport means in the housing for continuously transporting the film and engaging the film in the sound recording position;

support means in the housing for supporting a portion of said film transport means, said support means being movable to effect engagement of said transport means with the film; and

positioning means in the housing for moving said movable support means to the sound recording position in response to closing of the cover;

said positioning means including switch means mounted in one of said cover and housing and responsive to opening and closing of the cover, and electromagnetic means responsive to said switch means;

said electromagnetic means being operatively coupled to said support means for moving said support means.

4,076,397

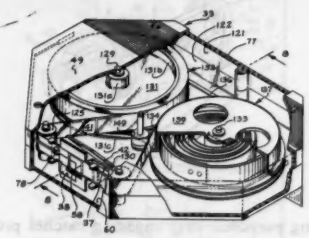
FILM PROJECTION SYSTEM

Charles J. Becker, San Jose, Calif., assignor to American Videonetics Corporation, Sunnyvale, Calif.

Division of Ser. No. 517,919, Oct. 25, 1974, Pat. No. 3,951,536. This application Dec. 22, 1975, Ser. No. 643,557
Int. Cl.² G03B 23/12
U.S. Cl. 353—26 R **6 Claims**

1. A film projection viewing system comprising a projector including a relatively large hollow housing, an optical display viewing screen for receiving images projected onto said screen from a film, a lens system disposed within said housing, a light source disposed within said housing and adapted to be pro-

jected along a light path defined through a film and said lens system to project an image onto said viewing screen, means carried by said housing for receiving a film cartridge, a film cartridge within the last named means, a film transport within the cartridge including first and second rolls of film respectively wrapped about first and second hubs, a window formed through said cartridge and aligned in the path of said film, a drive body coupled for rotation with the first hub and disposed coaxially of and substantially coplanar with the second hub, a coil spring having one end connected to the drive body and the



other end connected to the second hub to provide a resilient driving connection between the drive body and the second hub, said spring being pretensioned to tension the film extending between the rolls to cause that portion of said film disposed across said window to lie in a plane free of deformation in the surface of said film portion as said film moves in either of two directions, and motive means carried in said housing independently of said cartridge and disposed to engage and drive said transport through said drive hub in either of two directions at varying rates while said film remains under the tension applied by said spring.

4,076,398

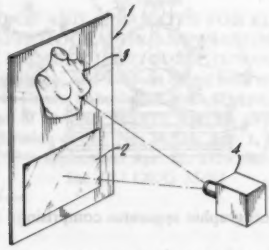
VISUAL COMMUNICATIONS SYSTEM

Charles L. Galbraith, Raritan, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 405,194, Oct. 10, 1973, abandoned. This application Aug. 26, 1975, Ser. No. 607,743

Int. Cl.² G03B *21/26, 21/14*

U.S. Cl. 353—69 **3 Claims**



1. A method of preparing, aligning and registering a two-dimensional image which, when projected onto multiple projection-receiving surfaces, at least one of said surfaces being a three-dimensional represenatation of said image, projects as a distortion-free image of said representation, comprising photographing and projecting a grid axis consisting of equal sized squares onto a three-dimensional screen, photographing the projection on the three-dimensional screen from several angles and positions, and projecting onto the three-dimensional screen a two-dimensional photograph prepared from a single representation of each of the photographs of the grid, said representation having incorporated therein the distortions apparent in the grid as projected onto the three-dimensional screen, making two series of photographs of a representation consisting of evenly spaced lines on horizontal and vertical axes by moving said representation horizontally in one series and with each successive photograph moving the representation to the right or left the distance equal to the space between said evenly spaced lines, repeating the same procedure through the vertical axis, projecting each photograph onto the two-dimensional screen, selecting one photograph from the horizontal and vertical series, the lines from said photographs describing a rectangle which is part of the first image in a series used to align and register the images on the screen, placing a transparent overlay containing evenly spaced lines in horizontal and vertical axes over the first piece of art prepared for the three-dimensional surface, simultaneously photographing art for the two-dimensional screen, consisting of three rectangles, and the art prepared for the three-dimensional screen, holding the art for the two-dimensional screen stationary throughout the photographing procedure, making two series of photographs of the two pieces of art, moving the art for the three-dimensional screen through one axis and then through the other, projecting both series of photographs onto two-dimensional and three-dimensional screens, aligning the two-dimensional screen art for each image such that the outer rectangle is not visible, selecting one photograph from each of the horizontal and vertical series of the three-dimensional art, said photographs being the images which most precisely register with the contour of the three-dimensional surface, noting the veritcal and horizontal lines indicating the position from which the art for the three-dimensional screen was photographed, photographing the image to be projected on the two-dimensional screen and the image to be projected on the three-dimensional screen simultaneously to form a bifurcated image, said images comprising representations drawn within the boundaries determined by the rectangle on the two-dimensional screen and the boundaries defined by the photographs selected from the horizontal and vertical series of the three-dimensional art, said bifurcated image being the first image in any series of images made for projection onto said multiple projection-receiving surfaces, repeating said photographic process with each successive piece of art, said art being photographed in the same positions used to prepare the images which were precisely aligned and registered on both the two-dimensional and the three-dimensional screens.

4,076,399

CONTROL MECHANISM FOR A PLURALITY OF SLIDE PROJECTORS

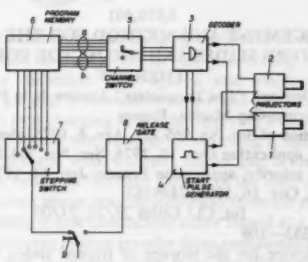
Rudolf Schlei, Kronberg, Taunus, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 18, 1975, Ser. No. 605,581

Claims priority, application Germany, Aug. 16, 1974, 2439182

Int. Cl.² G03B *21/26*

U.S. Cl. 353—86 **9 Claims**



1. A control system for at least two slide projectors each projector having a light source subject to control by an electrical signal, said system comrpising:

freely programmable memory means for storing program instructions for controlling the operation of the projectors, said memory means capable of being programmed

prior to and during operation of said projectors, said memory means being a cross-bar distributor having columns and rows forming cross-over points, said cross-over points being connected by bridging means, a predetermined arrangement of bridged cross-over points forming a control program;

selector means for selecting a predetermined portion of said control program and for providing signals corresponding thereto said selector means including a stepping switch device to automatically change the control program of said cross-bar distributor memory means, said device including an actuating key, a stepping motor and a stepping switch; and

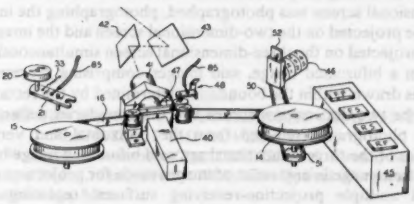
decoding means, responsive to signals provided by said selector means, for decoding said signals and for providing functional control signals for controlling the activation and deactivation of respective projector light sources.

4,076,400

MICROFILM TRANSPORT WITH AUTOMATIC THREADING

Thomas J. Persha, Juneau, and David Jagielski, West Bend, both of Wis., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jul. 21, 1976, Ser. No. 707,172
Int. Cl.² G03B *1/58;* G11B *15/32;* G03B *1/48*
U.S. Cl. 353—95 **14 Claims**



1. An automatic threading device for a microfilm reader comprising a film transport mechanism having at least a supply reel and take up reel, means for driving said take up reel to pull film from said supply reel and move it through said transport mechanism, capstan means driven simultaneously with the driving of said take up reel for selectively engaging or disengaging the perimeter of a film roll on said supply reel, when engaging said perimeter, said capstan peeling off said film and causing it to follow a path through said reader to said take up reel, and one-way clutch means interposed between said take up reel and said capstan for transmitting a driving force to turn said capstan means only when said film moves in a direction which feeds it to said take up reel.

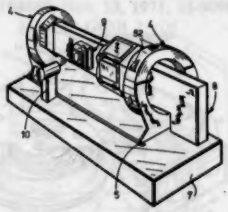
4,076,401

ARRANGEMENT AND METHOD FOR THE STORAGE OF LANTERN SLIDES AND PROJECTOR FOR VIEWING THEREOF

Bohdan Drwiega, "Les Turquoises" Avenue de la Paix, F-06190 Requebrune-Cap-Martin, France

Continuation of Ser. No. 565,251, Apr. 4, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 734,171
Claims priority, application France, Jun. 14, 1974, 74 21542; Germany, Oct. 16, 1974, 2449243
Int. Cl.² G03B *23/10, 21/00*
U.S. Cl. 353—108 **2 Claims**

1. A device for the storage of framed slides, each of said slides having a viewing surface, the device comprising: a plurality of pocket strips composed of strip-shaped, superposed bottom and top parts, each of said strips being formed with a plurality of window openings, at least some of said openings being adjacent to one another; a plurality of superposed moldings associated with said strip-shaped parts, respectively, extending along each of said window openings and somewhat recessed with respect thereto, said moldings serving to hold the framed slides with their viewing surfaces in said window openings, one of said strip-shaped parts being formed with a plurality of recesses, one of said moldings including pins fitting into corresponding ones of said recesses of the other of said parts, said pins and said recesses constituting releasable joining means, each of said pocket strips having longitudinal and lateral edges and at least some hinges for linking at least some of said pocket strips to one another at said longitudinal edges to allow articulated movement between the linked pocket strips



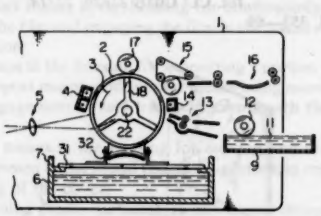
for projecting purposes; strip engaging catches provided on opposite lateral edges of the linked pocket strips said linked pocket strips forming a plurality of leaves, each of said leaves having an edge formed with perforations, each of said perforations having a predetermined diameter, said perforations being spaced from one another at predetermined distances for the perforation diameters and distances to correspond to those of clamps of an album into which the framed slides are insertable, said strip-shaped parts being inherently stiff so as to permit only a limited amount of elastic deformation.

4,076,402

ELECTROPHOTOGRAPHIC APPARATUS WITH DETACHABLE PHOTOCONDUCTIVE DRUM

Tadaaki Kanno, and Sunao Ikeda, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jan. 30, 1976, Ser. No. 653,879
Claims priority, application Japan, Jan. 31, 1975, 50-13566
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 DR **10 Claims**



1. Electrophotographic apparatus comprising:

a housing;

a photoconductive drum having a rotary axis and rotatably mounted in the housing in an operative position, the photoconductive drum being detachable from the housing through movement in its axial direction from the operative position; and

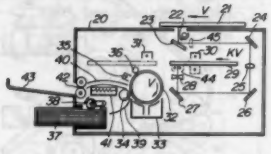
a roller assembly mounted below and axially spaced from the photoconductive drum when the photoconductive drum is in the operation position, the roller assembly comprising at least one roller having a rotary axis perpendicular to the rotary axis of the photoconductive drum, the photoconductive drum engaging with and being guidingly supported by the roller assembly at positions which are equally spaced from a lowest portion of the photoconductive drum when moved axially for detachment from the housing.

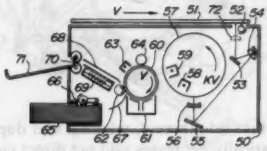
4,076,403

ELECTROGRAPHIC PROCESS

Masaji Nishikawa, Hachioji, and Eiichi Sato, Tama, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 6, 1976, Ser. No. 747,527
Claims priority, application Japan, Dec. 11, 1975, 50-146830
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—35 C 3 Claims





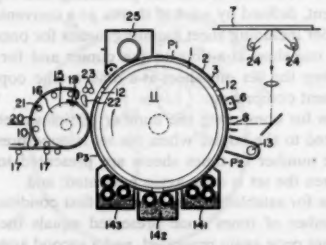
1. An electrographic process comprising using a screen-shaped photosensitive body composed of at least one electric conductive layer and photoconductive layer, uniformly charging said photoconductive layer, illuminating said screen-shaped photosensitive body with a light image corresponding to a picture image of a manuscript to be recorded so as to form an electrostatic latent image on said photoconductive layer, directing a flow of corona ions through said screen-shaped photosensitive body toward a dielectric coated image receiving body and controlling said flow of corona ions by said electrostatic latent image to form, on said dielectric coated image receiving body, an electrostatic charge image corresponding to an image to be recorded, said process comprising a further step of making a radius of curvature of said screen-shaped photosensitive body different from that of said dielectric coated image receiving body, arranging these two bodies in opposed and spaced apart relation and driving said two bodies at surface speeds which are different from each other.

4,076,404

METHOD OF AND APPARATUS FOR ELECTRONIC COLOR PHOTOGRAPHY AND PHOTOSENSITIVE MEMBER USED FOR THE SAME

Katsumi Nagamatsu, and Takashi Saito, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 245,671, Apr. 19, 1972, abandoned, which is a division of Ser. No. 24,734, Apr. 1, 1970, Pat. No. 3,832,170. This application Apr. 22, 1974, Ser. No. 463,159
Int. Cl.[2] G03G *15/01*
U.S. Cl. 355—4 10 Claims



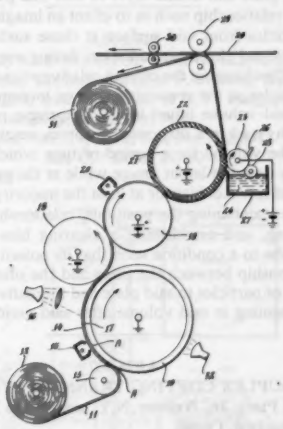
1. An electronic photocopying apparatus comprising:
photosensitive members mounted in juxtaposed relationship on a movable carrier and corresponding in number to resolved colors, each of said photosensitive members being formed of a supporting member, a photoconductive layer and a transparent insulating layer providing a color filter effect;
means for driving said movable carrier;
means for forming an electrostatic latent image on the surface of each of said insulating layers forming the uppermost layer of said photosensitive members juxtaposed on said movable carrier;
developing means for visualizing said electrostatic latent images disposed in juxtaposed relationship with said electrostatic latent image forming means and corresponding in number to the resolved colors, said developing means using different toners complementary to the colors of the color filters provided by said insulating layers; and
means for transferring said visualized images onto an image transfer member in superposed relationship by causing said image transfer member to effect a cycle of movement with respect to the movement of said photosensitive members for sequentially engaging each said photosensitive member over the total length of each said member.

4,076,405

LIQUID INK IMAGING SYSTEM

Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 4, 1976, Ser. No. 692,837
Int. Cl.[2] G03G *15/10*
U.S. Cl. 355—10 4 Claims



1. An electrostatographic imaging apparatus comprising a photoconductor assembly; means for positioning the inner surface of a dielectric web against said photoconductor whereby an air gap is formed between said photoconductor and said web; first charging means for applying a charge to the outer surface of said web, means for exposing a light pattern through the charged web, whereby the air gap is ionized and forms a latent image on the inner surface of the web; means for guiding the latent image bearing web away from the photoconductor, including a first conductive roller biased at a potential sufficient to prevent charge transfer from said assembly to said web as the web is guided away from the photoconductor; means for guiding the latent image bearing web away from the first roller to expose the outer surface of the web, including a second conductive roller biased at a potential sufficient to prevent transfer from said first roller to said web; second charging means for applying a charge to the outer surface of said web when said web is in contact with said second roller, said charge being sufficient to neutralize said first charge;

means for guiding the latent image bearing web away from the second roller, including a third conductive roller having an insulating coating thereon, said third roller being biased at a potential to prevent charge transfer from said second roller to said web; a liquid developing system for developing the latent image on said web; and means for transferring said developed image from said web to an image copy member.

4,076,406

METHOD OF AND APPARATUS FOR TONING ELECTROPHOTOGRAPHIC FILM

Peter Guy Talmage, and Manfred Rudolf Kuehnle, both of Lexington, Mass., assignors to Coulter Information Systems, Inc., Bedford, Mass.

Continuation-in-part of Ser. No. 523,370, Nov. 13, 1974, abandoned. This application Jun. 7, 1976, Ser. No. 693,631

Int. Cl.[2] G03G *15/10*

U.S. Cl. 355—10 **19 Claims**

1. A method for toning the latent image on a charged electrophotographic member which has been exposed to a radiation pattern which members includes an ohmic layer and a photoconductive coating, the latent image being formed by selective charge distribution in the photoconductive coating in increments dependent upon the amount of radiation received and to selectively attract toner particles of one polarity related to the charge acceptance characteristic of the coating for each increment of charge at the surface in inverse relation to the amount of radiation received by that increment, said method comprising: bringing a conductive plate into juxtaposed parallel relation with the surface of the coating to define a liquid toner retaining volume, applying a low d.c. bias voltage between the plate and ohmic layer of said one polarity and of a value and relationship such as to effect an imaging bias to repel toner particles from said surface at those surface increments which received the most radiation during exposure without substantially changing the overall relative attraction pattern of toner particles at the remaining surface increments, introducing into said volume liquid toner comprising particles of said one polarity and in a dispersant medium, retaining the liquid toner in the volume for a period of time which will substantially fully tone the latent image while at the same time maintaining said low d.c. bias for at least the majority of said period while also maintaining the positional relationship of said plate and coating, and establishing a clearing bias by increasing imaging bias to a condition such that its polarity and the voltage relationship between the plate and the ohmic layer favor attraction of particles to said plate and thereafter removing the liquid remaining in said volume after said period.

4,076,407

DUPLEX COPYING TRANSFER SYSTEM

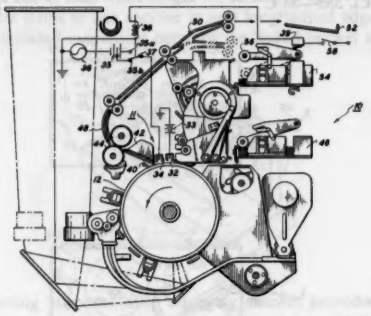
George H. Place, Jr., Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 18, 1976, Ser. No. 668,008

Int. Cl.[2] G03G *15/00, 15/16*

U.S. Cl. 355—14 **1 Claim**

1. In an electrostatic copying apparatus in which a first image of fusable material formed on an initial image support surface is transferred by electrostatic field producing transfer means applying transfer charges to a first side of a copy sheet, and said first image of fusable material is then thermally fused to said copy sheet by fusing means acting thereon, and in which a second image formed on said initial image support surface is transferred to the second, opposite, side of said same copy sheet by said transfer means subsequent to said fusing of said first image to said first side, wherein said transfer means includes detacking corona generator means for applying an alternating current output with a net direct current output of neutralizing charges to said copy sheet to at least partially neutralize said transfer charges, and wherein said net direct current output of said detacking corona generator means has a nominal output current level for said transfer of said first image to said first side of said copy sheet, the improvement comprising duplex switching means for automatically changing said nominal output current level of said detacking corona generator for said transfer of said second image to said second side of said copy sheet to compensate for changes in the transfer characteristics of said copy sheet due to said first image being



fused to said first side thereof, wherein said duplex switching means automatically decreases said net direct current neutralizing charge output from said detacking corona generator for said transfer of said second image to said second side of said copy sheet relative to said nominal output current level.

4,076,408

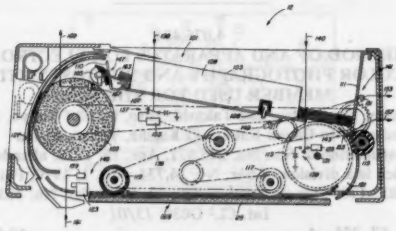
COLLATING DOCUMENT FEEDER WITH MULTIPLE FEED DETECTOR

Michael Gerald Reid, Rochester; Leroy Ellery Burlew, Clyde, and David Charles Hogan, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,758

Int. Cl.[2] G03G *21/00*

U.S. Cl. 355—14 **8 Claims**



1. In a document feeder for presenting and representing a document, defined by a set of sheets, to a convenience copier; the feeder including sheet handling means for once presenting the set one-sheet-at-a-time to the copier and for once again presenting the set one-sheet-at-a-time to the copier; the improvement comprising:

means for comparing the number of times sheets are presented to the copier when the set is once presented, with the number of times sheets are presented to the copier when the set is once again presented; and

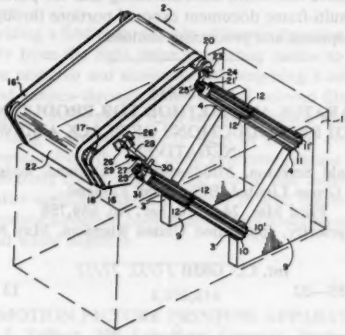
means for establishing an apparent first condition when the number of times once presented equals the number of times once again presented, and a second apparent condition different from the first condition when the number of times once presented differs from the number of times once again presented.

4,076,409

BELT TYPE SENSITIVE MEMBER UNIT

Hiroshi Hamaguchi, Sakai, and Shin Miyata, Toyokawa, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 553,841, Feb. 27, 1975, Pat. No. 3,958,879. This application Apr. 30, 1976, Ser. No. 681,989
Claims priority, application Japan, Mar. 7, 1974, 49-27093
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 11 Claims



11. An electrophotographic reproducing apparatus having a main body portion; a belt-type photosensitive member unit normally located in an operative position internal to the main body and including a framework and a plurality of rollers rotatably confined within the framework, a belt-type sensitive member being trained about said plurality of rollers and said rollers comprising a drive roller, said unit comprising:

first guide means rigidly secured at two points along the length thereof to the main body of the reproducing apparatus; and

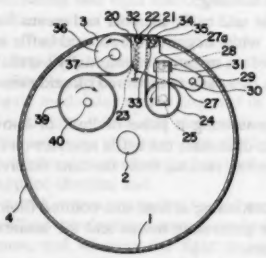
second guide means attached to said sensitive member unit outwardly thereof and adapted to cooperate telescopically with said first guide means to permit displacement of said sensitive member unit to a position external to the main body.

4,076,410

PHOTORECEPTOR DRUM FOR USE IN ELECTROPHOTOGRAPHIC COPYING APPARATUS

Tateomi Kono, Toyokawa, and Takashi Kuwako, Okazaki, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 30, 1976, Ser. No. 718,937
Claims priority, application Japan, Oct. 3, 1975, 50-135853; Aug. 2, 1976, 51-104840
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 12 Claims



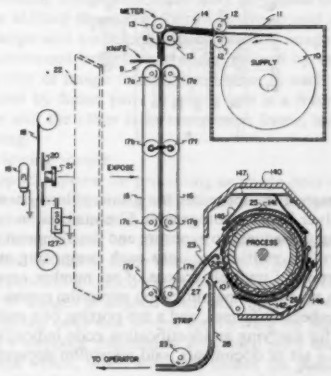
1. In a photoreceptor drum for use in an electrophotographic copying apparatus which includes a rotatory cylindrical drum member having a slot in the outer periphery thereof parallel to the drum axis, a supply roll member and a takeup roll member rotatably disposed in said cylindrical drum member, a sheet-like photoreceptor having one end thereof attached to said supply roll member and the other end thereof attached to said takeup roll member, a supply of said sheetlike photoreceptor being wound around said supply roll member and drawn out therefrom through said slot and along the outer periphery of said cylindrical drum and wound onto said takeup roll member upon rotation thereof for replacement of said photoreceptor, and means covering said slot, the improvement comprising covering means being selectively movable between a first position covering said slot and a second position remote from said slot, means for moving said covering means between said first and second positions for raising said covering means from said first position to said second position at the time of replacement of said sheet-like photoreceptor, lock means having a lock gear connected to one end of said supply roll, a locking claw member engagable with said lock gear for locking said supply roll against rotation, and a cylindrical rotatable cam member having a notch and having said claw member engaged with the outer periphery thereof, and means for associating the releasing of said claw member from said lock gear and from said notch with said moving means for raising said covering means, whereby said cam member is rotated during the replacement of sheet-like photoreceptor from said supply roll, during which rotation said claw member is disengaged from said notch by said associating means, and said claw member is engaged with said notch after a predetermined amount of said sheet-like photoreceptor is drawn off said supply roll.

4,076,411

APPARATUS AND METHOD FOR MAKING PRINTS

Bruce E. Crayton, Rochester; James F. Wilson, Webster, and Carl H. Zirngibl, Irondequoit, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 14, 1975, Ser. No. 632,031
Int. Cl.² G03B *29/00*
U.S. Cl. 355—28 17 Claims



1. An apparatus for making prints, from sensitized sheets, the apparatus comprising:

an exposure station including means for selectively exposing and means for supporting a sensitized sheet during exposure thereof to form a latent image on the sheet;

a processing station for developing an exposed sheet, the processing station including means defining a rotatably supported drum upon which each portion of an exposed sheet may be supported for rotation with the drum for a substantially fixed time period that is required for the processing of the sheet;

means for rotatably supporting the drum and for rotating the drum about its axis at a rate such that the drum makes one complete revolution in a time period that is less than the said time period required for the processing of the sheet;

means for delivering a sensitized sheet to the exposure station for selective exposure thereof and for simultaneously removing a previously exposed sheet from the exposure station and advancing same onto the drum while the drum is rotating at said rate so that the leading portion of such exposed sheet is taken up first by the rotating drum and succeeding portions of such sheet are thereafter taken-up in turn upon the drum;

sheet removing means adapted to be located adjacent the drum for removing a processed sheet from the rotating drum by removing the leading portion of the sheet first with succeeding portions of such sheet being removed in turn from the drum; and

control means coupled to said sheet removing means for controlling the sheet removing means so that the sheet removing means removes the processed sheet from the drum only after each portion of the sheet has been supported on the drum for more than one complete revolution of the drum.

4,076,412

PROCESS FOR PRODUCING MICROFILM COPIES AND APPARATUS THEREFOR

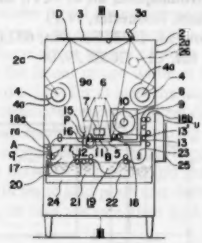
Shunkichi Igarashi, Yokohama; Takeshi Okano, Amagasaki; Sho Takahama, Takarazuka, and Yoshio Hakamata, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jun. 7, 1976, Ser. No. 693,671

Claims priority, application Japan, Jun. 7, 1975, 50-68945; Jun. 20, 1975, 50-76194

Int. Cl.² G03B *29/00*

U.S. Cl. 355—28 **4 Claims**



1. In a microfilm apparatus for a microfilm system which employs silver halide photographic film material in roll form, and forming subsequent to exposure and development a plurality of microfilm multi-frame units each comprising an image-carrier portion of multiple frames of set number exposed for production at reduced magnification microfilm copies of documents at respective frames, and a tab portion of a multi-frame set length for carrying an identification code indicative of the content of a set of documents, said microfilm apparatus comprising:

an exposure station and a development and processing station;

drive roll means positioned near said exposure station and operable to feed film material in roll form to said exposure station to permit individual frames of said film material to be exposed to image-wise light reflected from individual documents to be microfilmed,

means for actuating said drive roll means to unwind said roll of film material and move successive frames of said film material to and past said exposure station;

control means for causing said drive roll means to intermittently move said film material a distance equal to one frame length to permit a set number of film material frames to be successively brought to said exposure station, and for continuously moving said film material a plural number of frames over a set distance subsequent to bringing said set number of frames individually and sequentially to said exposure station;

cutter means, and

means for actuating said cutter means by said control means for cutting said film material to detach successive microfilm multi-frame units from the remainder of said film material prior to development and processing; and

independently actuable advance roll means for advancing successive microfilm units including said tab portion and said multi-frame document exposed portions through said development and processing stations.

4,076,413

APPARATUS AND METHOD FOR PRODUCING COLORED REPRODUCTIONS OF BLACK AND WHITE NEGATIVES

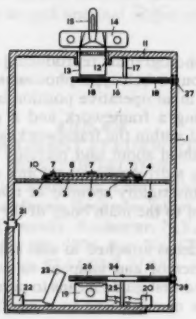
John Ronald Smeaton, Middlesbrough, England, assignor to Tioxide Group Limited, Billingham, England

Filed Mar. 24, 1976, Ser. No. 669,758

Claims priority, application United Kingdom, May 8, 1975, 19347/75

Int. Cl.² G03B *27/32, 27/52*

U.S. Cl. 355—32 **13 Claims**



1. Apparatus for producing colored photographic reproductions of black and white negatives, said apparatus comprising:

a housing providing when closed a substantially light-free enclosure;

said housing having an aperture for receiving a camera lens therethrough;

means for mounting a camera outside said housing with the camera lens extending through said lens receiving aperture into said housing;

a baffle member disposed in the interior of said housing spaced from the lens receiving aperture and extending across the housing;

an aperture in said baffle member and means for mounting a black and white negative across said baffle aperture with the plane of the negative substantially parallel to the plane of the lens of a camera mounted on said camera mounting means;

means for generating a pulse of light of known time and intensity to illuminate the baffle aperture on the side of the baffle member remote from the lens receiving aperture; and

means for positioning at least one colored filter between the light pulse generating means and the camera lens receiving aperture.

13. A method for producing colored photographic reproductions of black and white negatives comprising the steps of: providing apparatus comprising a housing providing a sub-

stantially light-free enclosure; a camera mounted on the outside of said housing with the camera lens received through an aperture in the housing wall, a baffle member disposed in the interior of the housing spaced from the camera lens, said baffle member having an aperture therethrough substantially parallel with the plane of the camera lens, means to generate a pulse of light of known time and intensity on the side of the baffle member remote from the camera lens and means for selectively positioning at least one of several colored filters between the light pulse generating means and the camera lens;

mounting a black and white negative across the baffle aperture;

providing a first pulse of light of known duration and intensity from the light pulse generating means to illuminate the negative and simultaneously exposing a color film in said camera through a first desired colored filter;

removing the negative from across the baffle aperture;

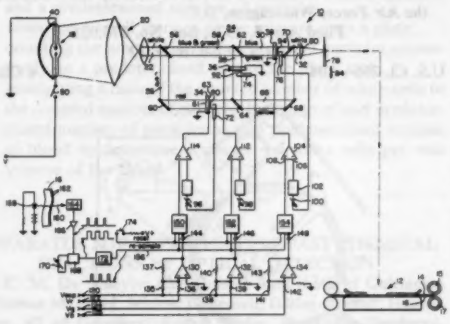
providing a second pulse of light of known duration and intensity from the light pulse generating means and simultaneously reexposing the said film in said camera over its entire surface through a second desired colored filter to produce a colored photographic reproduction of the black and white negative.

4,076,414

MOTION PICTURE PRINTING APPARATUS

David J. Tulbert, 308 Laburnum Crescent, Rochester, N.Y. 14610

Filed Feb. 18, 1975, Ser. No. 550,261
Int. Cl.² G03B *27/78*
U.S. Cl. 355—38 **108 Claims**



1. An optical printer for making copies of a master film comprising:

a. means for supporting a master film;

b. means for supporting a copy film;

c. a light source;

d. a printing gate;

e. means, including said light source for focusing an optical image from a master film supported by said master film supporting means onto a frame of a copy film supported by said copy film supporting means and located in said printing gate, to effect exposure thereof:

f. electro-optic modulator means disposed in the light beam between said light source and said printing gate for controlling the exposure of a copy film, the light transmitted by said modulator means being a function of the electrical energy applied thereto; and

g. electric circuit means connected to said modulator means for controlling the electrical energy applied to said modulator means, and wherein the light transmitted by said modulator means is a function of the electric field strength applied thereto, and said electric circuit means controls the voltage applied across said modulator means, and

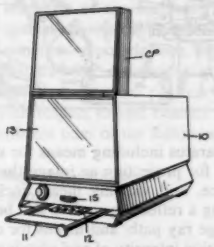
h. said modulator means comprising a PLZT electro-optic ceramic.

4,076,415

MICRORECORD HAVING MIRROR-IMAGES

Adnan Waly, Stamford, Conn., assignor to Izon Corporation, Stamford, Conn.

Continuation of Ser. No. 443,028, Feb. 15, 1974, Pat. No. 3,995,956. This application Mar. 22, 1976, Ser. No. 668,979
The portion of the term of this patent subsequent to Dec. 7, 1993, has been disclaimed.
Int. Cl.² 355 *27;* G03B *13/28, 27/32, 23/08*
U.S. Cl. 355—45 **4 Claims**



2. A reader-copier machine for a microrecord whose reduced scale images may be selectively projected for viewing by an observer or for copying without the use of an image-reversing mirror, said microrecord comprising a common carrier having formed thereon a main set of images each being a photograph in a reduced scale of only one side of a document or other form of intelligence, and a companion set of images displaced from the main set of images, each companion image being the mirror image of the corresponding photograph in the main set, no other images being formed on the common carrier, whereby a selected main image may be viewed by aligning it with an optical system to project it onto a screen and the corresponding companion image may be copied onto a sensitive film shifting the microrecord relative to said optical system to align said corresponding companion image therewith, said microrecord being a microfiche formed by several horizontal rows of image frames, the frames in each row being constituted by frame pairs in which one is a frame from the main set and the other is its companion frame, said machine comprising:

A a viewing screen;

B an optical system for projecting an image onto said screen;

C a platform supporting said microrecord in operative relation with said optical system;

D indexing means to shift said platform relative to said optical system to cause the platform to assume one operative position in which a selected main image from the main set of images is aligned with said optical system and is projected onto said screen for viewing by said observer and a stepping mechanism associated with said indexing means which, when actuated, causes the platform to assume another operative position in which the companion image of the selected main image is aligned with said optical system and is projected onto said screen for copying;

E a retractable copier having a sensitive film, said copier being retracted from said screen when the selected main image is presented thereon, said copier overlying said screen when the companion image is presented to make a copy thereof; and

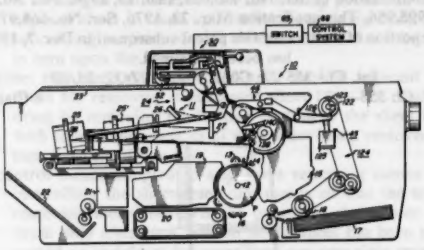
F means to illuminate said selected main image in said one operative position at a level suitable for viewing and to illuminate the companion image in said other operative position at a higher level suitable for copying.

4,076,416

ILLUMINATION SLIT FOR AND A PROCESS OF USE THEREOF IN A REPRODUCING MACHINE

Robert W. Corbin, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 3, 1976, Ser. No. 682,302
Int. Cl.[2] G03B 27/48, 28/50, 27/70
U.S. Cl. 355—49 16 Claims



1. In an apparatus including means for strip-wise viewing a document and for projecting an image thereof onto a moving imaging surface, said viewing means including: at least one reflector having a reflecting surface and being arranged along an optical image ray path; and means for controlling the projected illumination intensity of said viewing means comprising, an illumination slit arranged along said image ray path, said slit being defined by at least one boundary configured in a desired slit profile which is elongated and defines an opening for the passage of image rays therethrough which is wider at the ends of said slit than in the middle thereof; the improvement wherein:

said reflector and said slit are integral, and wherein said integral reflector and slit comprise:

means for delimiting said reflecting surface so that at least one boundary defined by said reflecting surface is configured in said desired slit profile, said delimiting means comprising a boundary of said reflector which is shaped so that it is configured in said desired slit profile.

16. In a process of making an apparatus for strip-wise viewing a document and for projecting an image thereof onto a moving imaging surface, including the steps of providing at least one reflector having a reflecting surface being arranged along an optical image ray path; and providing a means for controlling the projected illumination intensity of said viewing means comprising, an illumination slit arranged along said image ray path, said slit being defined by at least one boundary configured in a desired slit profile which is elongated and defines an opening for the passage of image rays therethrough which is wider at the ends of said slit than in the middle thereof; the improvement wherein, said process includes:

making said reflector and said slit integral by delimiting said reflecting surface so that at least one boundary defined by said reflecting surface is configured in said desired slit profile, said delimiting step comprising:

masking a desired portion of said reflecting surface with a mask whose outer boundary is configured in said desired slit profile;

coating the unmasked portion of said reflecting surface with a non-reflecting material; and

removing said mask from said reflecting surface.

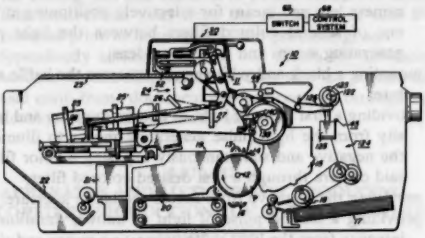
4,076,417

INTERLOCKING APPARATUS FOR AN OPTICAL SYSTEM AND REPRODUCING MACHINE

Fujio Hayashi, Webster, and Robert W. Corbin, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 3, 1976, Ser. No. 682,694
Int. Cl.[2] G03B 27/70; H01H 9/20, 33/46
U.S. Cl. 355—60 10 Claims

1. In an apparatus including means for viewing a document and for projecting an image thereof onto a moving imaging surface, said viewing means including: a plurality of optical elements arranged along an optical path; means for changing the projected image modification, said magnification changing means including means for changing the positions of at least two of said optical elements so that the projected image magnification is a function of the positions of said at least two optical elements, the improvement wherein:



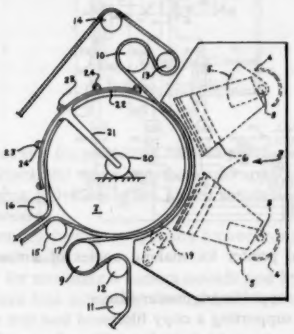
interlock means associated with said magnification changing means are provided for inhibiting the change in position of one of said at least two optical elements until the other of said at least two optical elements has changed its in position upon changing projected image magnifications.

4,076,418

FILM SLEWING DEVICE FOR DRUM TYPE CONTACT PRINTER

Edward F. O'Brien, Northampton, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 5, 1976, Ser. No. 674,021
Int. Cl.[2] G03B 27/22
U.S. Cl. 355—104 4 Claims



1. In a drum type contact printer in which an inner copy film and an outer master film are transported in contact over the portion of a rotatable drum that substantially coincides with the light exposure region of said contact printer, the improvement comprising a film slewing device, said film slewing device comprising

a film separating means configured and arranged for slideable insertion between said copy and master films and having means for providing free transport of said outer master film thereover, said film separating means comprising a thin arcuate sheet member conformed to the outer periphery of said drum and having a length substantially equal to the length of said light exposure region, said arcuate member residing on said inner copy film and being rotatable about the longitudinal axis of said drum, and

means for selectively inserting said film separating means

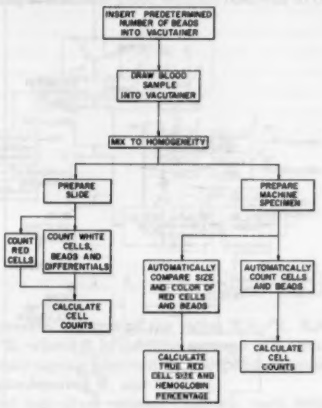
into and out of position between said copy and master films.

4,076,419

METHOD AND APPARATUS FOR HEMATOLOGY

Richard G. Kleker, 242 25th St., Richmond, Calif. 94804

Filed Jul. 12, 1976, Ser. No. 704,429
Int. Cl.[2] G01N *33/16*; G01F *17/00*; C09K *3/00*
U.S. Cl. 356—39 **6 Claims**


INSERT PREDETERMINED NUMBER OF BEADS INTO VACUTAINER
DRAW BLOOD SAMPLE INTO VACUTAINER
MIX TO HOMOGENEITY
PREPARE SLIDE
PREPARE MACHINE SPECIMEN
COUNT RED CELLS
COUNT WHITE CELLS, BEADS AND DIFFERENTIALS
AUTOMATICALLY COMPARE SIZE AND COLOR OF RED CELLS AND BEADS
AUTOMATICALLY COUNT CELLS AND BEADS
CALCULATE CELL COUNTS
CALCULATE TRUE RED CELL SIZE AND HEMOGLOBIN PERCENTAGE
CALCULATE CELL COUNTS

1. A method of hematology testing comprising the steps of:
a. mixing to homogeneity a predetermined volume of blood and a predetermined number of particles;
b. smearing a small amount of the mixture onto a plate;
c. counting the white cells of the blood and particles respectively on a predetermined area of the plate; and,
d. multiplying a ratio of the counted number of white cells to the counted number of particles by a ratio of said predetermined number of particles to said predetermined volume of blood to determine a number of white cells per unit volume of the blood.

4,076,420

APPARATUS FOR INVESTIGATING FAST CHEMICAL REACTIONS BY OPTICAL DETECTION

Leo C. M. De Maeyer; Carl-Roland Rabl, both of Gottingen; Thomas M. Jovin, Schloss Berlepsch; Detlev Riesner, Hannover, all of Germany; Rudolf Rigler, Stockholm-Danderyd, Sweden; Lutz Bodo Veil, Gottingen, Germany, and Hans Lehrach, Vienna, Austria, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Aug. 19, 1974, Ser. No. 498,816
Claims priority, application Germany, Feb. 22, 1974, 2408646
Int. Cl.[2] G01N *21/00, 1/10*; G01J *3/30*
U.S. Cl. 356—73 **101 Claims**

1. Apparatus for investigating fast chemical reactions by optical detection, said reactions being initiated in a chemical system by an external perturbation, said apparatus comprising means for performing said external perturbation, at least one light path, means for supporting a sample cell in said light path, said sample cell forming a cell chamber for holding a liquid sample of said chemical system, at leat one photodetector, said light path comprising a light source, a monochromator, means for imaging said light source onto the entrance of said monochromator, and means for imaging the exit of said monochromator onto said sample cell chamber, said apparatus comprising also means for directing light from said liquid sample onto said photodetector, the improvement comprising:

(a) a set of at least two different types of sample cells, each of said types having one different means for application of at least one parameter of perturbation, said means comprising:

(a.1) two electrodes facing opposite sides of said chamber for temperature-jump and field-jump perturbation,

(a.2) a pressure autoclave and pressure release means for pressure-jump perturbation,

(a.3) at least one optical window in an auxiliary light path for flash-light perturbation,

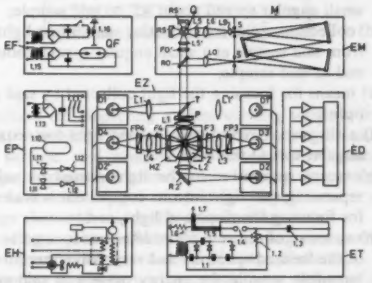
(a.4) a mixing chamber and flow-channels for rapid mixing, and

(a.5) two electrodes, a mixing chamber, and flow-channels for combined rapid mixing and temperature-jump perturbation; each of said sample cells having a specific sample volume at least two optical windows for application of at least one of the following parameters of observation: optical absorption, fluorescence, scattered light, and parameters of polarization, said sample cells having identical exterior dimensions at least in their middle parts and an identical position of their main optical axis with respect to said exterior dimensions;

(b) at least two different ones of the following perturbation supply means:

(b.1) a high-voltage pulse source,

(b.2) a pressure supply,



(b.3) a flash-light source, and

(b.4) a stopped-flow drive system;

(c) a metallic sample cell holder mating said sample cells and holding one selected sample cell operatively inserted into said apparatus, said holder comprising:

(c.1) a hollow structure having a main axis, enclosing said selected sample cell in close mechanical and thermal contact,

(c.2) threaded fixation means for clamping said sample cell therein,

(c.3) thermostatting channels connected to a liquid thermostatting system,

(c.4) window openings for passing said light path in a direction perpendicular to the main axis of said hollow structure, and

(c.5) means for connecting a high-voltage pulse source at one end of said hollow structure; and

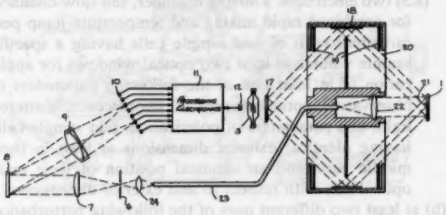
(d) a set of changeable optical elements adapting said light path to the optical dimensions of the chamber of said selected sample cell, said elements comprising at least one lens mounted in an axially adjustable holder and at least one diaphragm modifying the free exit aperture of said monochromator.

4,076,421

SPECTROPHOTOMETER WITH PARALLEL SENSING

Stanley J. Kishner, Pomona, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.

Continuation-in-part of Ser. No. 669,592, March 23, 1976, Pat. No. 4,022,534. This application Sep. 13, 1976, Ser. No. 722,581
The portion of the term of this patent subsequent to May 10, 1994, has been disclaimed.
Int. Cl.² G01J 3/42
U.S. Cl. 356—96 9 Claims



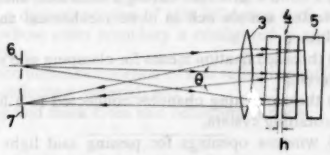
1. A reflection spectrophotometer with parallel sensing for analyzing the light diffusely reflected by a sample comprising:
(a) a source of white light;
(b) means for diffusing the light emitted by said source;
(c) illumination optics for uniformly illuminating said sample with said diffuse light from a complete annular ring at a small angular spread about 45° to said sample;
(d) collection optics for collecting said diffuse light reflected from said sample at a small angular spread about the normal to said sample;
(e) means for focusing the light collected by said collection optics;
(f) a slit responsive to said focused light for restricting the angular spread thereof;
(g) means responsive to the light passed by said slit for separating said light into its component wavelengths and for focusing the dispersed light; and
(h) an array of discrete photodetectors located in the plane of the focused spectrum and responsive thereto for simultaneously sensing the energy present at said component wavelengths.

4,076,422

FABRY-PEROT INTERFERENCE SPECTROMETER

Tsuguo Kohno, Tokorozawa, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Feb. 23, 1976, Ser. No. 660,378
Claims priority, application Japan, Feb. 24, 1975, 50-22646
Int. Cl.² G01B 9/02
U.S. Cl. 356—106 S 5 Claims



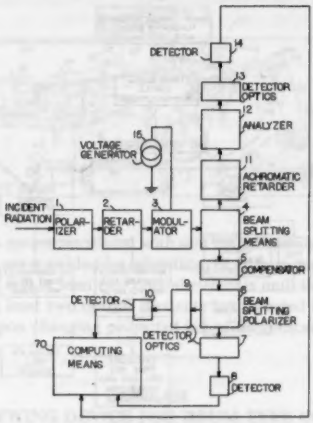
1. A single Fabry-Perot interference spectrometer, comprising an optical system including slits and a lens, a Fabry-Perot interferometer and a reflecting mirror disposed behind said Fabry-Perot interferometer non-perpendicularly to the optical axis of said interferometer, whereby a forward light path parallel to said optical axis and a reverse light path slanted relative to the optical axis are established so that the rays of light travel forward and back along said two light paths through the interferometer.

4,076,423

OPTICAL COHERENCE MEASURING DEVICE

Harry E. Bates, 240 E. Ridgewood St., Orlando, Fla. 32801

Continuation of Ser. No. 518,759, Oct. 29, 1974, Pat. No. 3,927,945. This application Dec. 12, 1975, Ser. No. 640,050
The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.
Int. Cl.² G01J 4/00
U.S. Cl. 356—114 8 Claims



1. An apparatus for studying the coherence of beams of optical radiation comprising:
a. optical means for polarizing the radiation;
b. means for dividing the resulting polarized beam into two independent orthogonally polarized components;
c. means for generating a phase retardation between the two independent orthogonally polarized components;
d. optical elements for projecting the beam into at least two independent states of polarization such that at least two intensities are provided which supply information needed to calculate the independent elements of the coherency matrix;
e. means for detecting at least two independent intensities and thereafter converting them into electrical analogue signals; and
f. means for calculating the complex degree of coherence from said at least two independent intensities.

4,076,424

MULTI-CHANNEL IMPLICIT RATIO COMPUTER FOR SEQUENTIAL SIGNALS

Edward Stanley Ida, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

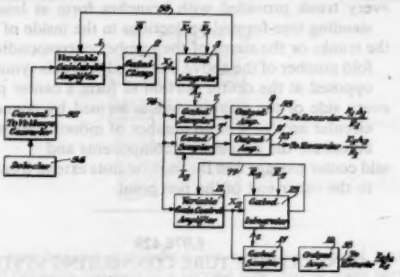
Filed Mar. 24, 1976, Ser. No. 670,080
Int. Cl.² G01J 3/48; G01N 21/22; H03K 5/18
U.S. Cl. 356—188 5 Claims

1. In a multi-channel electrical signal ratioing circuit for a source delivering an electric analog signal pulse sequence constituting measured parameter signals $A_1, A_2 \ldots A_n$ and a plurality of reference signals $R_1, R_2 \ldots R_m$,
signal gating and timing means having signal identification means maintaining time coordination with said signal pulse sequence, and gate actuating means responsive to said signal identification means, actuating, for predetermined time durations, the respective gates corresponding to said parameter signals $A_1, A_2 \ldots A_n$, and said reference signals $R_1, R_2 \ldots R_m$,
a first variable gain amplifier which imparts a gain G to said parameter and reference signals,
a first gated integrator which, during a gated period $\overline{R}$, wherein at least one of said reference signals $R_1, R_2 \ldots$

R_m is delivered, has a first input terminal receiving the sum of said signal pulse sequence of a given polarity from said amplifier and a substantially constant preselected DC reference voltage K of opposite polarity, and a second input terminal connected to common,

a feedback connection between the output side of said gated integrator and said first amplifier to control the gain-determining means thereof,

a signal withdrawal circuit connection delivering said output of said first amplifier to a first sampling circuit incorporating at least one gated sampler reserved to the readout



of a preselected one of the ratios KA_1/R, KA_2/R, . . . KA_n/R, where R is the time average of a selected set of reference signals admitted by the gated integrator during said gated period R, and

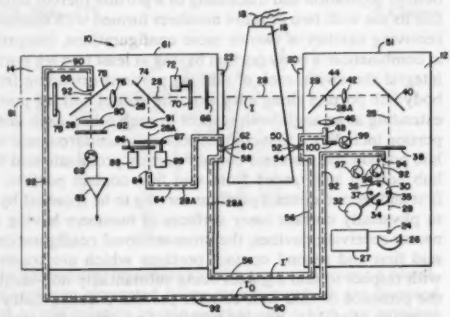
additional individual ratioing channels, each incorporating its own variable gain amplifier, gated integrator feedback and sampling circuit, connected to the output of said first amplifier via said signal withdrawal circuit connection determining additional signal ratios with respect to other reference signal sets R selected from said plurality R_1, R_2 . . . R_m.

4,076,425

OPACITY MEASURING APPARATUS

Julian Saltz, 16 Benford Drive, Princeton Junction, N.J. 08550

Filed Feb. 17, 1976, Ser. No. 658,763
Int. Cl.² G01N 21/22
U.S. Cl. 356—205 **13 Claims**



1. An opacity measuring apparatus for measuring the opacity of effluent flowing through a furnace stack comprising:

(a) a collimated light source disposed to direct a narrow beam of light in a first light path within said stack and through said effluent therein;

(b) a photoelectric detector disposed to measure the light transmitted across said stack for providing a first electrical signal related thereto;

(c) means for providing a second light path for the collimated beam external to said stack, said second light path directing said narrow beam of light towards said photoelectric detector for providing a second electrical signal related thereto; said second electrical signal being displaced in time from said first electrical signal;

(d) circuit means coupled to said photoelectric detector for providing a third electrical signal related to the ratio of said first electrical signal to said second electrical signal; and

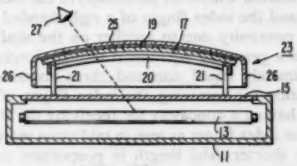
(e) means for peak detecting said first and second electrical signals, said peak detecting means peak detecting said first and second electrical signals prior to obtaining said third electrical signal.

4,076,426

METHOD FOR INSPECTING CATHODE-RAY-TUBE WINDOW FOR OBJECTIONABLE CORD

Harvey Andrew Gross, Circleville, Ohio; Harry Robert Frey; John David Messner, both of Lancaster, Pa., and Raymond Frederick Walters, Columbus, Ohio, assignors to RCA Corporation, New York, N.Y.

Filed Jun. 29, 1976, Ser. No. 700,892
Int. Cl.² G01N 21/16
U.S. Cl. 356—239 **9 Claims**



1. A method for inspecting a glass viewing window for a cathode-ray tube, said viewing window having a light-scattering inner surface, said window to be used for transmitting video images displayed on a luminescent viewing screen within said tube, said video images comprising a repetitive array of video image elements, said method comprising

(a) providing a pattern of visually contrasting areas, which pattern approximates said array of image elements,

(b) positioning said pattern adjacent said inner surface of said window,

(c) observing said pattern through said window,

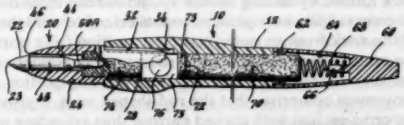
(d) and identifying those local regions of said window where said pattern appears distorted.

4,076,427

WRITING INSTRUMENT HAVING A PREDETERMINED GRASP SHAFT CONFIGURATION

Charles Roger Anderson, 20 East St., Proctor, Vt. 05765

Continuation of Ser. No. 399,389, Sep. 21, 1973, abandoned.
This application Mar. 19, 1975, Ser. No. 559,918
Int. Cl.² A46B 5/02
U.S. Cl. 401—6 **9 Claims**



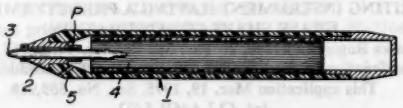
1. In a hand-held writing instrument having transfer means with a writing tip for transferring a marking medium to a surface in recognizable form and having a shaft for holding said transfer means with said writing tip at one end of said shaft and being of overall dimension and weight to permit grasping by the thumb, index finger and middle finger of a hand, said shaft being operatively connected to the transfer means, the

invention comprising said shaft having a longitudinal axis and a circular cross section over the major portion of its length concentric about said axis, said shaft extending generally symmetrically straight along its axis, said marking medium transfer means having a longitudinal axis aligned with and concentric with the axis of the shaft and with said tip being concentrically located with respect to the shaft axis, said shaft having a grasping region extending upwardly along the shaft from a lower boundary, the lower boundary of said grasping region being located between seven-eighths of an inch and one and three-eighths of an inch from the writing tip, said grasping region having therein three axially elongated indentations, each of said indentations commencing at said lower boundary and extending upwardly longitudinally along the shaft from said lower boundary for receiving the thumb, index finger and middle finger, respectively, of a right-handed person, said three indentations being positioned about the periphery of the shaft, the two indentations for receiving the thumb and index finger respectively each being of an elongated tear-drop shape which is enlarged and rounded near said lower boundary and tapering upwardly to merge with the circular cross section of the shaft, said three indentations being generally symmetrically arranged one to another about the shaft axis such that a cross section through the shaft, taken perpendicular to the shaft axis at the location where the perimeters of the indentations for the thumb and the index finger of a right-handed person come in closest proximity one to another on the shaft periphery, appears as a generally equilateral triangle having three sides of approximately equal size and three rounded vertices, said indentation for receiving the index finger of a right-handed person having a concavity for receiving the thumb side of the tip of the index finger as seen in said cross section, and being of slightly shorter axial length in proportion to the other two indentations, thereby to assure that the tips of the user's thumb and index finger are positioned at the optimum distance from the writing surface and to enable the grasping region to be held by a comfortable and relaxed grasp for reducing writing tension while ensuring complete control over the writing instrument.

4,076,428
PEN POINTS FOR WRITING INSTRUMENTS

Nobuyuki Otake, Tokyo; Kozo Ando, Chiba, and Hironobu Hori, Higashikana, all of Japan, assignors to Tokyo Boshi Kabushiki Kaisha, Tokyo, Japan

Filed May 10, 1976, Ser. No. 684,677
Claims priority, application Japan, May 15, 1975, 50-56693
Int. Cl.² B43K 1/06
U.S. Cl. 401—265 **31 Claims**



1. In pen point for writing instruments which is a rod-shaped wick formed by uniting molten synthetic resin monofilaments, wherein radially curved narrow slots extend toward the center of the wick from an outer periphery portion (ring portion) in the cross-section and the radial narrow slots are defined by a plurality of segments projected from the ring portion, an improvement comprises that the rod-shaped wick is provided in the cross-section with curved narrow slots extending not only in the substantially radial direction toward the center from the inside of the ring portion but also in the other directions,

said narrow slots are defined by the components of the pen point consisting of the ring portion forming the outer periphery of the rod-shaped wick, a plurality of trunk portions or trunk portions and stem segments which are projected inwardly from the inner periphery of the ring and partition the inner space of the ring and a plurality of branch portions, which are branched and projected from every trunk and additionally partition the remainder of the above described space,

said components of the trunks, the trunks and stems and branches are adjacently arranged so that the top portions, the end portions and the sides of these components are not connected with one another and that these components constitute 2 - 6 fold axis symmetry wherein the center axis of the ring is the rotary axis,

every component of the ring, the trunks, the stems and the branches has at least one size and shape,

every trunk provided with branches form at least one of standing tree-formed projections in the inside of the ring,

the trunks or the stems of the number corresponding to the fold number of the above described fold axis symmetry are opposed at the center portion to form a center passage,

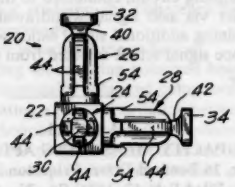
every side of the narrow slots is formed by connection of circular arcs of a large number of monofilaments, which constitute the elementary components and

said center passage and the narrow slots extend from one end to the other end of the pen point.

4,076,429
CONVERTIBLE TUBE CONNECTING SYSTEM

Irving L. Berkowitz, Binghamton, N.Y., assignor to Kason Hardware Corporation, Binghamton, N.Y.

Continuation-in-part of Ser. No. 628,584, Nov. 4, 1975, Pat. No. 4,023,913. This application Aug. 26, 1976, Ser. No. 717,873
Int. Cl.² F16B 7/00
U.S. Cl. 403—2 **5 Claims**



1. A convertible connector specifically designed to enable a desired separation and discarding of a portion thereof to facilitate its use with two or more members formed with connector-receiving cavities of two or more configurations, comprising, in combination: a body portion having at least two leg portions integral therewith, each of said leg portions extending from a body hub portion along a leg axis, the axes of said leg portions extending at an angle with respect to each other, each said leg portion including a first contact portion spaced from said body hub portion and a second contact portion proximate said body hub portion and spaced from said first contact portion, said first and second contact portions serving to be received by and to physically contact inner surfaces of members having connector-receiving cavities, the cross-sectional configurations of said first and second contact portions which are transverse with respect to said leg axes being substantially non-identical, the presence of said first contact portion enabling entry and retention of said leg portion within a first connector-receiving cavity of a first configuration whereby first said first contact portion and thereafter both of said first and second contact portions engage said inner surfaces, the absence of said first contact portion due to said separation further enabling entry and retention of its respective leg portion within a second connector-receiving cavity that will not cooperatively accept said first contact portion and whose inner surfaces are engaged by said second contact portion, and localized frangible means disposed substantially at the juncture of said first and second contact portions for facilitating desired physical separation of said first contact portion from the rest of its respective said leg portion at predetermined points spaced from said body por-

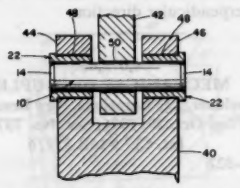
tion, said frangible means comprising a frangible neck portion of said leg portion spaced from said body hub portion.

4,076,430

PIN AND LOCKING COLLAR CONNECTOR FOR LOAD BEARING PARTS

Edward J. Crook, Jr., 6348 S. 70th East Ave., Tulsa, Okla. 74133

Filed Jun. 4, 1976, Ser. No. 692,999
Int. Cl.[2] F16B 21/00, 2/14
U.S. Cl. 403—154 9 Claims



1. In a load bearing connection for a first mechanical part positioned between the ears of a second mechanical yoke part having axial openings through said parts comprising:

a locking collar having a resilient metal bushing of selected metallurgical properties having a flange at one end, of length at least the length of an opening through one of said mechanical parts and positioned within said opening;

a longitudinal slot through said bushing and flange,

a uniform diameter pin extending through said openings and said bushing, said pin of length substantially no greater than the outside width across the assembled parts and collar,

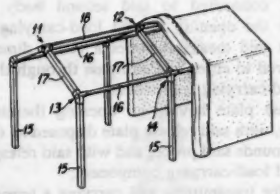
the internal diameter of said collar less than the diameter of said pin such that said collar and pin are firmly clamped for rotation together relative to said parts which openings are larger than the outside diameter of said collar.

4,076,431

CONNECTING ELEMENT

Sten Burvall, 7, Hjartervagen, S-142 00, Trangsund, Sweden

Filed Aug. 9, 1976, Ser. No. 712,998
Int. Cl.[2] F16B 7/00
U.S. Cl. 403—171 5 Claims



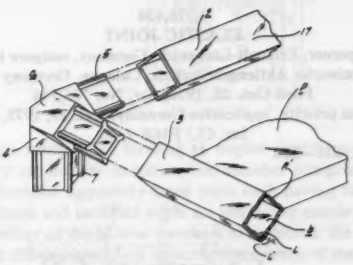
1. In a structural framework of the type comprising a plurality of separate, elongated frame members which are disposed in end to end relation to one another and which are oriented respectively in horizontal, vertical, and oblique directions to define different sections of said framework, the adjacent ends of said frame members being interconnected to one another by connecting elements at a plurality of junction points that are located respectively at the adjacent ends of groups of said frame members, said junction points and their associated connecting elements being disposed in spaced relation to one another throughout said framework, the improvement wherein the connecting elements provided at said junctions throughout said framework all have the same structural shape and configuration, each of said connecting elements consisting of first and second elongated, hollow sleeves which are interconnected to one another adjacent corresponding ends thereof, said first and second sleeves being open at the respective ends thereof remote from their interconnected ends for respectively receiving the ends of two of said frame members, said first and second sleeves being oriented at an angle of substantially 120° to one another and having a pair of outer faces which are coplanar with one another, and a third elongated, hollow sleeve located between the interconnected ends of said first and second sleeves and integral therewith for interconnecting said first and second sleeves to one another, said third sleeve being open at both ends thereof whereby said third sleeve is adapted to receive a further pair of said frame members at opposite ends of said third sleeve respectively, said elongated third sleeve being oriented at substantially 90° to said coplanar outer faces of said first and second sleeves, one of the open ends of said third sleeve being substantially flush with said coplanar outer faces of said first and second sleeves, and said elongated third sleeve extending in one direction only away from said coplanar faces of said first and second sleeves with the other open end of said third sleeve being positioned remote from said coplanar faces whereby said connecting element exhibits an asymmetrical configuration wherein said first and second sleeves are attached to and located adjacent one end of said elongated third sleeve.

4,076,432

CORNER CONSTRUCTION

Harold Glaser, St. Louis County, Mo., assignor to James David Incorporated, Maryland Heights, Mo.

Filed Aug. 30, 1976, Ser. No. 718,776
Int. Cl.[2] F16B 7/00
U.S. Cl. 403—176 3 Claims



1. A corner connector for developing a corner construction for furniture and the like comprising a body, a plurality of arms integral with said body and projecting therefrom in axially perpendicular relationship to the at least immediately proximate arm, each arm having a normally free end spacedly from said connector body, each arm tapering inwardly toward its free end so that the free end is of less cross-section than the opposite or body-adjacent end, each of said arms being of four-sided character and having projecting ridge-like elements at the intersection of adjacent sides, the axis of projection of said ridge-like elements being at an angle greater than 90° to the planes of the adjacent sides of the related arm, each of said ridge-like elements spacedly from the adjacent sides having an outer arcuate edge, said arms being presented with respect to said body whereby adjacent ridge-like elements are disposed within mutually perpendicular planes, and each arm being of tubular character having a substantially coextensive bore opening outwardly through the free end thereof.

4,076,433

ATTACHMENT FOR GARAGE DOOR SPRING

William Halopoff, 17720 Crusader St., Cerritos, Calif. 90701

Filed Jun. 3, 1976, Ser. No. 692,307
Int. Cl.[2] F16G *15/04*; F16B *45/00*
U.S. Cl. 403—213 15 Claims

1. An attachment device for making a secure connection between an attachment element at one end of a counterbalance coil spring and an attachment element on a hanger,

said attachment device comprising a length of rod,

a shoulder configuration at a first end of said rod for reception of one of said attachment elements and a hook configuration at one portion of the rod for engagement with another of said attachment elements,

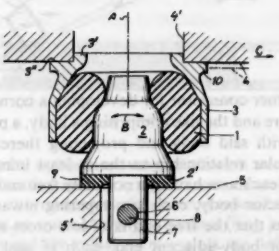
a retention section comprising a substantially flat band having legs angularly disposed relative to each other forming a corner, said legs each having aperture means therethrough engaging over respective ends of the rod, one of said aperture means comprising a slot extending into both of said legs at the corner and providing a counter shoulder configuration for engagement with the hook configuration on said rod, and mutually interlocking means respectively on said retention piece and said ends of the rod whereby to secure the respective attachment element in place and the leg of said retainer engaging the hook position having its free end facing the same direction as the first end of said rod.

4,076,434

ELASTIC JOINT

Peter Sperner, Erfstadt-Lechenich, Germany, assignor to Clouth Gummiwerke Aktiengesellschaft, Cologne, Germany

Filed Oct. 28, 1976, Ser. No. 736,714
Claims priority, application Germany, Oct. 29, 1975, 2548350
Int. Cl.[2] F16B *1/00*
U.S. Cl. 403—224 4 Claims



1. In an assembly of a lower body and an upper body interconnected with limited relative mobility by at least one elastically deformable joint, the improvement wherein said joint comprises:

a first member centered on a substantially vertical axis and secured to one of said bodies;

a second member substantially coaxial with said first member;

a pivotal connection linking said second member with the other of said bodies for limited relative swinging in a predetermined plane including said axis;

a resilient coupling between said members enabling omnidirectional relative tilting thereof against a substantially uniform elastic restoring force; and

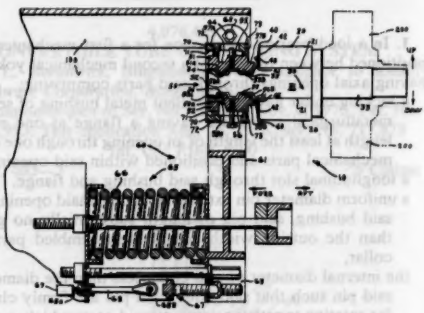
resilient cushioning means interposed between said second member and said other of said bodies for limiting the swing in said plane, said pivotal connection preventing any relative movement of said second member and said other of said bodies in a direction perpendicular to said plane whereby the resistance to relative displacement of said bodies in a direction parallel to said plane is less than in said perpendicular direction.

4,076,435

MECHANICAL DECOUPLER

Howard C. Gueldner, 237 Barcelona, New Braunfels, Tex. 78130

Filed Oct. 29, 1976, Ser. No. 737,117
Int. Cl.[2] F16B *21/16*
U.S. Cl. 403—322 9 Claims



1. A reusable mechanical apparatus for coupling and automatically decoupling a first body and a second body, wherein the automatic decoupling is accomplished while said first and second bodies are under a tension load, and wherein said reusable mechanical apparatus is actuated for decoupling of said first and second bodies by non-explosive means, comprising:

a. a load-carrying component, connected to said second body, with said load-carrying component having an opening therein and therethrough;

b. means, connected to said second body, for passing through the opening in said load-carrying component, wherein said means includes a probe dimensioned and configured to enter into and pass through the opening in said load-carrying component;

c. a release plate having an opening therein and therethrough, with said release plate disposed so that the opening surrounds said probe, and with said release plate abutting said load-carrying component;

d. means for transmitting and carrying a tension load from the probe of said release plate and, thereby, to said load-carrying component;

e. means, pivotally connected to said first body, for releasably engaging and holding the probe, wherein said means includes:

(1) a lever arm-like element having a first end and a second end, with the first end pivotally connected to said first body;

(2) means for biasing the second end of said lever arm-like element;

(3) and, means for releasably securing said biasing means in a biased condition;

f. and, an interface element interposed between said means for releasably engaging and holding the probe and said means for transmitting and carrying a tension load from

the probe to said release plate and to said load-carrying component.

4,076,436

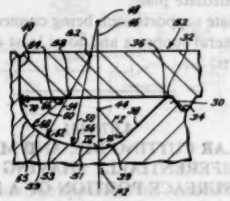
STRESS RELIEVED TOOL ELEMENTS

Damon T. Slator; Archie W. Peil, and Thomas R. Bishop, all of Houston, Tex., assignors to Bowen Tools, Inc.

Continuation of Ser. No. 541,642, Jan. 6, 1975. This application Feb. 5, 1976, Ser. No. 655,442

Int. Cl.² F16B 7/18; E21B 17/042

U.S. Cl. 403—343 6 Claims



1. A drill string mounted tool having a threaded end which is joined to an abrupt shoulder by a new and improved stress relief groove, comprising:

a first partially curved groove portion descending from said threaded end to a point of minimal wall thickness where said groove is the deepest; and

a second groove portion ascending from said point of minimal wall thickness to said abrupt shoulder in a series of curved segments which are joined at common tangents to provide a continuously ascending curved groove portion, each curved segment having a consecutively smaller radius of curvature from said point of minimal wall thickness to said abrupt shoulder whereby stress concentration is substantially reduced between said threaded end portion and said abrupt shoulder.

4,076,437

POSITIVE CAM LOCK FOR EXTENSION POLE

Richard Mazzolla, Bloomfield, N.J., assignor to H & G Industries, Inc., Belleville, N.J.

Filed Mar. 4, 1977, Ser. No. 774,710

Int. Cl.² F16B 2/18

U.S. Cl. 403—350 5 Claims

1. A positive cam lock for inner and outer telescoping poles which are longitudinally adjustable along a longitudinal axis comprising a cam support mounted to one end of said inner pole, an idler cam mounted on said cam support for concentric rotation with respect to said inner and outer poles, a locking cam rotatably mounted on said cam support, said locking cam being eccentrically mounted with respect to the central longitudinal axis of said inner and outer poles, and positive engagement means acting between said outer pole and said idler cam and locking cam for simultaneous rotation of said idler and locking cams with said outer pole to cause said eccentrically mounted locking cam to engage the inner surface of the outer pole for locking the position of said inner pole with respect to said outer pole.

4,076,438

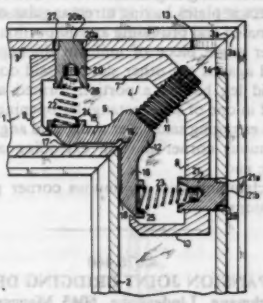
TIE MEMBERS FOR ANGLED JOINTS

André Bos, Toulouse, France, assignor to Technal International S.A., Toulouse Cedex, France

Filed Feb. 28, 1977, Ser. No. 772,995

Int. Cl.² F16D 7/04

U.S. Cl. 403—402 9 Claims



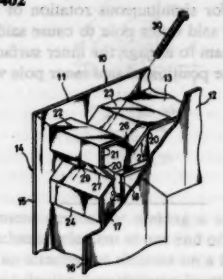
1. A tie member for forming an angled joint between two obliquely cut hollow members, said member comprising two non-deformable oppositely-faced parts each having two arms whose shape and included angle are suitable to enable them to fit into either of the hollow members to be joined, the arms of one part coming into place adjacent those walls of the hollow members which are situated on the inside of the angle and the arms of the other part coming into place adjacent the opposing walls situated on the outside of the angle, and the corners of the two parts being situated near the plane of junction of the two hollow members, said tie member also having means for moving one part relative to the other which are so arranged as to enable the parts to be moved apart by a pressure exerted where their corners are situated, and wherein one of said parts contains two retractable plungers, one of which is carried by one arm and is arranged to slide substantially perpendicularly thereto in an opening formed in said arm, and the other of which is carried by the other said arm and slides in a similar fashion, spring members arranged to cause each said plunger to project from the appropriate arm towards the adjacent wall of one of the hollow members so that said plunger can enter and latch in a bore formed in said wall, and wherein means are arranged between the facing arms of said two parts to form a resilient connection between said two parts and prevent them from becoming detached from one another.

4,076,439

CORNER PIECE FOR MITER JOINT

Masami Sakashita, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Jul. 28, 1976, Ser. No. 709,339
Claims priority, application Japan, Sep. 1, 1975, 50-121020
Int. Cl.² F16B 7/18
U.S. Cl. 403—402 2 Claims



1. A frame joint comprising:

a. a pair of perpendicularly arranged frame members each having an H-shaped cross-section defined by a pair of spaced outer walls and a connector plate extending therebetween for receiving and supporting a panel between said spaced outer walls at one side of said connector plate, the ends of said H-shaped members being angularly mated with each other, each of said connector plates having a rectangular opening therein adjacent its mated end providing an end portion therebetween;

b. a corner angle piece of uniform thickness having legs disposed against the other sides of said connector plates, each said leg having a portion formed as a projection received in one of said rectangular openings, the edges of said legs engaging said outer walls, said angle piece having a continuous corner portion extending about said end portions; and

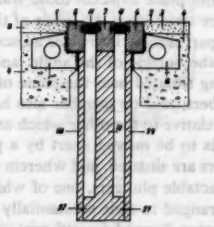
c. means clamping said continuous corner portion to said end portions.

4,076,440

EXPANSION JOINT BRIDGING DEVICE

Silvio Bertschmann, Lindenhohe, 6045 Meggan (Kt. Luzern), Switzerland

Filed Jul. 29, 1976, Ser. No. 709,658
Claims priority, application Switzerland, Jul. 29, 1975, 9852/75
Int. Cl.² E01C 11/02
U.S. Cl. 404—69 15 Claims



1. A device bridging over an expansion joint in a roadway and the like, especially in a bridge roadway, said device comprising:

a. a first edge plate extending in the joint longitudinal direction arranged at roadway level and anchored in one joint edge;

b. a second edge plate extending in the joint longitudinal direction, arranged at roadway level and anchored in the other joint edge;

c. at least one intermediate plate arranged between and spaced from said first and second edge plates;

d. elastically deformable seal elements provided between said intermediate plate and said first and second edge plates;

e. first downwardly extending flexible lateral supports supporting said first edge plate;

f. second downwardly extending flexible lateral supports supporting said second edge plate; and

g. downwardly extending intermediate supports supporting the intermediate plate;

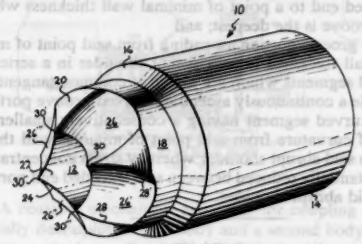
said intermediate supports each being connected to at least one of said first lateral supports and to at least one of said second lateral supports.

4,076,441

ANNULAR CUTTING DIE, AND METHOD OF CIRCUMFERENTIALLY SHAVING AWAY THE SURFACE PORTION OF A ROD

Joseph Edward Byrnes, Fairfield, Conn., assignor to General Electric Company, New York, N.Y.

Filed Sep. 27, 1976, Ser. No. 726,942
Int. Cl.² B26D 1/00
U.S. Cl. 407—64 12 Claims



1. An annular cutting die for the circumferential shaving away of the surface portion of a rod passing therethrough, comprising an annular body having an outer annular tapered surface and an inner annular tapered surface which converge to form an annular cutting blade, said outer annular tapered surface of the blade having four substantially symmetrical, radially extending facets formed therein with each of the borders of each of said facets adjoining a border of the next adjacent facet of the annular cutting blade to thereby provide four splitting edges substantially equally spaced about the annular cutting blade.

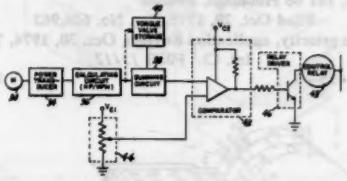
10. A method of circumferentially shaving away the peripheral surface portion of a rod as to form four discrete longitudinally extending shave sections, comprising providing an annular cutting die of a smaller circumference than the rod to be shaved, said cutting die comprising an annular body having an outer annular tapered surface and inner annular tapered surface which converge to form an annular cutting blade, with said outer annular tapered surface having four substantially symmetrical, radially extending facets formed therein with each of the borders of each of said facets adjoining a border of the next adjacent facet of the annular cutting blade to thereby provide four splitting edges substantially equally spaced about the annular cutting blade, and passing a rod through said die to circumferentially cut away the peripheral surface portion from around the rod passing through the annular die and split the circumferentially cut away peripheral surface portion of the rod into said four discrete longitudinally extending shave sections.

4,076,442

APPARATUS FOR CONTROLLING COOLANT FLOW IN ACCORDANCE TO EXTERNAL FORCES UPON A CUTTING TOOL

Joseph Henry Cox, Jr., and William Andrew Haggerty, both of Cincinnati, Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Mar. 7, 1977, Ser. No. 774,759
Int. Cl.² B23B 39/04, 27/10
U.S. Cl. 408—8 12 Claims



1. In a machine tool, an apparatus for controlling the flow of a cutting fluid to a cutting tool in accordance to tool engagement with a workpiece, comprising:

(a) a cutting tool;

(b) a cutting fluid conduit for directing cutting fluid to said cutting tool;

(c) means for generating a signal proportional to cutting forces upon said cutting tool; and

(d) a flow control valve in said cutting fluid conduit, said valve being responsive to said signal and opening when said signal exceeds a predetermined threshold level.

4,076,443

CUTTING TOOL ASSEMBLY

William Halpern, Haviland Road, Harrison, N.Y. 10528

Filed Jan. 7, 1977, Ser. No. 757,495
Int. Cl.² B23B 51/00, 31/10
U.S. Cl. 408—191 5 Claims

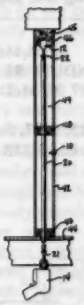
1. A cutting tool assembly comprising, the combination of, a drill having spiral flutes presenting flute surfaces extending from a shank portion to a cutting tip, an elongated tool holder having a central cylindrical cavity extending from one end thereof and snugly receiving said shank portion of said drill and a bore extension axially aligned and extending from said cavity to the other end of said tool holder, said bore extension being threaded, an adjusting plug positioned within said bore extension and having a cylindrical array of threads mating with the threads in said bore extension and having its end nearer said other end of said tool holder shaped to receive an adjusting tool to thereby turn said plug and move it longitudinally of said bore extension, said plug being positioned whereby it engages the end of said shank of said drill and prevents movement of said drill toward said other end of said tool holder, said cavity having an enlarged portion of greater diameter than the diameter of said drill adjacent said one end of said tool holder, said tool holder being threaded around the periphery of said enlarged portion of said cavity, a cutting head having a cylindrical body portion and a shank projecting axially therefrom and mating with and threaded into said enlarged portion of said cavity with the threads being such as to support said cutting head and provide for turning said cutting head directly from said tool holder through said shank of said cutting head, said cutting head having cutter portions which extend from said drill and which present cutting edges which are adapted to engage and cut away the material around a hole drilled in a work piece by said drill, and two screws threaded into bores extending axially of said body portion and locking said drill to said cutting head to said body portion by engagement with said flute surfaces of of said drill, whereby said cutting head is driven directly by said tool holder and is maintained in precise alignment with said hole by said drill and whereby said drill is driven directly by said cutting head.

4,076,444

DRILL BIT EXTENSION

Gary L. Siebrecht, 1647 S. Mulford Road, Rockford, Ill. 61108

Filed Mar. 29, 1974, Ser. No. 456,021
Int. Cl.² B23B 31/44
U.S. Cl. 408—226 13 Claims

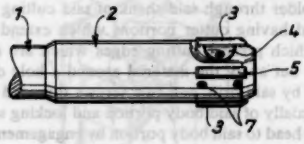


1. A drill bit extension for use with a drill bit comprising, a length of pipe having an unthreaded internal wall of preselected internal pipe size, a drill bit adapter fitting removably mounted in one end of the length of pipe and a chuck adapter fitting removably mounted in the other end of the length of pipe, said adapter fittings each including an externally threaded taper portion tapering from a minor outer diameter no larger than the internal pipe size to a major outer diameter sufficiently larger than the internal pipe size to form a binding fit with the pipe when turning threinto, said adapter fittings each including a pilot portion extending from the minor outer diameter end of the threaded taper portion and having an outer diameter substantially equal to said minor outer diameter and slidable in the pipe to maintain the axis of the respective fitting in alignment with the pipe axis when turning the threaded taper portion into the pipe, the drill bit adapter fitting having chuck means coaxial therewith for receiving the shank of the drill bit, and said chuck adapter fitting having shank means extending axially from the major end of its threaded taper portion for reception in a drill chuck.

4,076,445
MULTIPLE BLADE REAMER

Dieter Kress, Aalen, and Friedrich Haberle, Lauchheim, both of Germany, assignors to MAPAL Fabrik fur Prazisionswerkzeuge Dr. Kress KG, Aalen, Germany

Filed Nov. 2, 1976, Ser. No. 738,326
Claims priority, application Germany, Nov. 4, 1975, 2549260
Int. Cl.² B23B 27/00
U.S. Cl. 408—226 8 Claims

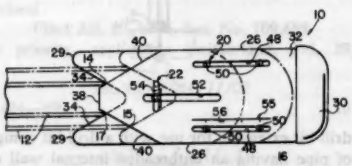


1. A reamer comprising:
(a) a shank defining an axis of rotation;
(b) a cutter head secured to one axially terminal portion of said shank;
(c) a plurality of cutting blades mounted on said cutter head,
(1) each cutting blade having a cutting edge elongated in the direction of said axis and radially projecting from said cutter head,
(2) said cutting edges being circumferentially distributed on said cutter head,
(3) each cutting edge defining two gaps extending from the cutting edge in opposite circumferential directions to another cutting edge;
(d) an axially elongated guide rib projecting from said cutter head in each of said gaps and being approximately centered circumferentially in the associated gap between the cutting edges defining said gap.

4,076,446
CONDUIT REAMER

Robert F. Lindstaedt, 717 N. McDowell - No. 501, Petaluma, Calif. 94952

Filed Mar. 15, 1977, Ser. No. 777,637
Int. Cl.² B23B 51/00
U.S. Cl. 408—227 10 Claims

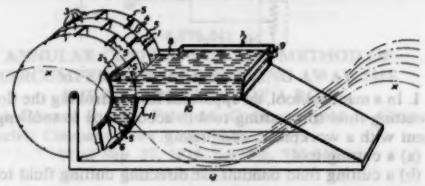


1. A reamer for use with a conduit, said reamer comprising:
a. positioning means, including engaging surfaces for maintaining the reamer in relatively fixed relationship with the front of the conduit being reamed,
b. said positioning means, being capable of engaging conduits of various diameters and rotatable relative to the conduit being reamed,
c. a reamer element mounted on each side of said positioning means, each said reamer element including a front end for positionment adjacent the aperture in the conduit being reamed and a pair of inclined sections extending outwardly from said front end and being capable of engaging the inner edge of the conduit being reamed and rotated relative thereto,
d. mounting means operatively associated with said positioning means and said reamer elements to provide relative longitudinal adjustment between said engaging surfaces and said inclined sections so as to obtain displacement therebetween, and
e. adjustment means for manually relatively linearly moving said reamer elements and positioning means to accommodate conduits of various sizes.

4,076,447
WATER-POWER MOTOR

Einar Granath, Apelvagen 15, and Alf Granath, both of Apelvagen 15, 141 46 Huddinge, Sweden

Filed Oct. 29, 1975, Ser. No. 626,962
Claims priority, application Sweden, Oct. 30, 1974, 7413654
Int. Cl.² F03B 13/12
U.S. Cl. 415—2 8 Claims



1. A water-power motor, preferably for rotating at a relatively low speed by the action of a rising and falling water surface, for instance the wave motion thereof, wherein said motor comprises at least one wheel rotatable on a horizontal axis and a plurality of compartments disposed peripherally in a suitable fashion in said at least one wheel, each compartment being defined by axially and radially disposed walls and by a pivotally mounted shutter disposed transversely of the peripheral surface of said wheel and forming when in one position the bottom of the compartment while allowing when in another position free tangential passage of water through the compartment, said shutter being mounted in such a manner that during one revolution of the wheel it will swing by gravity between a closed position and an open position, and wherein a container is arranged adjacent said wheel to cooperate therewith, from which container water successively flows into the compartments thereby causing the wheel to rotate, said container being formed so as to allow unimpeded inflow of water thereinto but permitting outflow of water therefrom only via the compartments of the wheel.

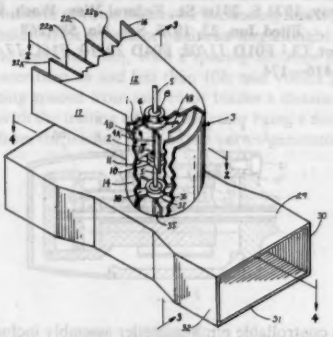
4,076,448
POWER GENERATING WATER TURBINE

Davis A. Sanders, Jr., P.O. Box 908, Baton Rouge, La. 70821

Continuation-in-part of Ser. No. 596,869, Aug. 21, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,754
Int. Cl.² F01D 1/08
U.S. Cl. 415—2 2 Claims

1. A water turbine comprising:
(a) an impeller assembly having multiple blades mounted perpendicularly on a rotatable axle,
(b) a housing assembly having a frame fixed about and attached to said impeller assembly, said wall having an opening for receiving a water stream, said opening comprising multiple flow channels formed by a series of curved plates wherein each channel has a water entrance section wider than a water exit section, each water exit section located at a different area about said blades, said opening extending outward and angularly to said water stream,
(c) a water vortex discharge assembly having a discharge channel to receive said water from below said blades and

delivering said water to a venturi eductor having a restricted passageway, and



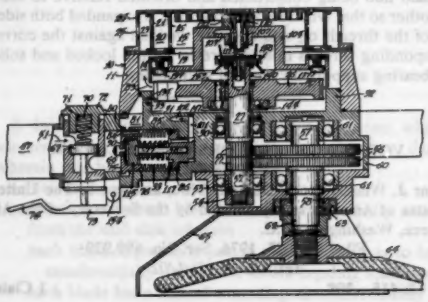
(d) a second turbine located within said discharge channel at a position within said restricted passageway.

4,076,449

PRESSURE GAS ENGINE

James V. Theis, Jr., Delray Beach; Lynn M. Davis, Boca Raton, and Donald H. Moss, Delray Beach, all of Fla., assignors to Hollymatic Corporation, Park Forest, Ill.

Filed Jun. 10, 1976, Ser. No. 694,894
Int. Cl.[2] F03B *15/18*
U.S. Cl. 415—18 5 Claims



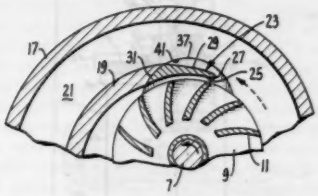
1. A pressure gas engine, comprising: a rotor having energy conversion means thereon for converting dynamic gas pressure to power; a drive axle; means for mounting said rotor on said axle for relative movement longitudinally of said axle; means interconnecting said rotor and drive axle for conjoint rotation; gas supply passage means to said engine adjacent one side of said rotor; gas exhaust passage means from said engine on the other side of said rotor; nozzle means in said supply passage for directing pressurized gas from said passage to said energy conversion means in one position of said rotor; means for moving said rotor to a second position at excessive speeds where said rotor energy conversion means are out of cooperative contact with said pressurized gas from said nozzle means; braking means on said other side of said rotor for retarding rotation of said rotor when out of said contact; and means for directing substantially the entire force of said pressurized gas from said nozzle means against said one side of said rotor for moving and holding said rotor against said braking means, the pressurized gas thereupon operating to rotate the rotor in one said longitudinal position of the rotor and for applying a braking force to the rotor in another said longitudinal position of the rotor.

4,076,450

DOUBLE VOLUTE PUMP WITH REPLACEABLE LIPS

Robert R. Ross, San Jose, Calif., assignor to United Centrifugal Pumps, San Jose, Calif.

Filed Jan. 14, 1976, Ser. No. 648,874
Int. Cl.[2] F04B *7/00*
U.S. Cl. 415—197 5 Claims



1. In combination with a pump having an impeller chamber and double volute passages formed by curved inner and outer casings and having a throat section, the inner casing having a free terminal tip which has defined therein a rounded slot extending transversely of the inner casing and the other casing having a pair of side walls with each side wall having a slot defined therein, the pump having an impeller chamber, a separate, replaceable volute lip mounted on the inner casing free terminal tip to be located in the volute throat section and comprising:

an integral central body;

a ramp portion on said body which has a curvature similar to that of the outer surface of the inner casing and a width equal to the width of the volute throat section;

a back surface on said body rounded to conform to the rounded slot in the outer casing to be received in that slot to mount the volute lip on the casing free terminal tip;

a front surface on said body rounded to define a lip member on said body; and

a pair of identical side members each located on one side of said body and oriented to be esssentially perpendicular with a plane defined by said body, each of said side members having top and bottom edges which are curved and which intersect each other to form leading edges located forward of said lip member, said side memers each having a rear edge which is rounded to have a radius of curvature similar to that of said body rounded back surface, said side members each having a bolt receiving hole defined therein, said side members extending beyond said ramp to be located outside of the volute throat section to fit into the outer casing slots to position the lip member in the volute at a point where liquid in the pump leaves the impeller and enters the volute with the volute lip being totally confined by engagement of said side member within the outer casing slots, said side members each forming part of a corresponding outer casing side wall, said volute lip being separable from the volute casing to be replaceable thereon when worn without requiring replacement of the volute casing.

4,076,451

CERAMIC TURBINE STATOR

Alan Lewis Jankot, South Glastonbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

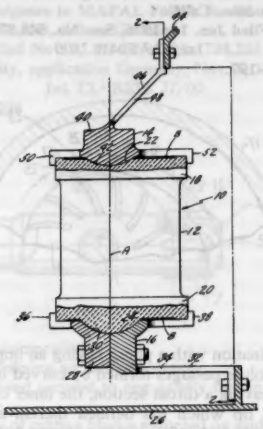
Filed Mar. 5, 1976, Ser. No. 664,129
Int. Cl.[2] F04D *29/02*
U.S. Cl. 415—217 12 Claims

1. A stator vane assembly, which includes:

an inner, continuous shroud having a central ring portion including a spherical surface facing outwardly therefrom;

an outer, continuous shroud having a central ring portion including a spherical socket facing inwardly therefrom; and

a ceramic vane disposed radially between said inner and said outer shrouds wherein the vane has an inner diameter



platform which is engaged by the spherical surface of the inner shroud and an outer diameter platform which is engaged by the spherical socket of the outer shroud.

4,076,452

GAS TURBINE PLANT

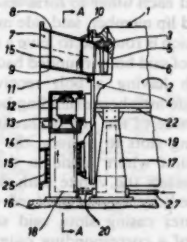
Max Hartmann, Baden, Switzerland, assignor to Brown, Boveri-Sulzer Turbomaschinen AG, Zurich, Switzerland

Continuation of Ser. No. 559,718, Mar. 19, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,515

Claims priority, application Switzerland, Apr. 9, 1974, 4978/74

Int. Cl.² F01B *25/24;* F02C *7/20*

U.S. Cl. 415—219 R **2 Claims**



1. In a stationary gas turbine supported upon a foundation having a bearing for the turbine rotor at the exhaust end of the turbine casing and wherein the flow passage through the gas turbine merges into an outlet diffusor ring, the outer and inner peripheral walls of said diffusor ring being supported with respect to each other by means of aerofoil-shaped ribs, and the bearing and its housing being located within a hollow space established within the inner peripheral wall, the improvement wherein a support structure solely for the bearing in the form of struts passes through said ribs which are hollow, the inner ends of said struts being secured to the bearing housing and the outer ends thereof to the foundation, and a second support structure completely independent of said bearing support structure and constituted by support elements located at opposite sides of the turbine casing securing the turbine casing to the foundation serves as the sole support for said casing.

4,076,453

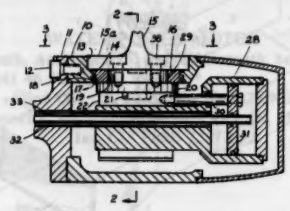
BEARING RING FOR BLADE OF A CONTROLLABLE PITCH PROPELLER

Arne Feroy, 1921 S. 291st St., Federal Way, Wash. 98002

Filed Jun. 23, 1975, Ser. No. 589,268

Int. Cl.² F01D *11/08;* F04D *29/10;* F16C *17/02*

U.S. Cl. 416—174 **5 Claims**



1. In a controllable pitch propeller assembly including a hub having a rotational axis, a plurality of propeller blades radiating from said hub, and means for turning each of said blades about a substantially radial rotational axis relative to the rotational axis of said hub, an improvement for journaling each of said blades in said hub comprising:

an annularly-shaped bearing ring having external threads thereon, said bearing ring having a radial gap therein, said hub having a radial bore and internal threads in said radial bore for receiving said bearing in threaded engagement, and

means operably associated with said gap for expanding said bearing ring to interlock said threads on said bearing ring with the threads in the radial bore of said hub, said threads on said bearing ring and said threads in the radial bore of said hub being constructed and oriented relative to each other so that when said bearing ring is expanded both sides of the threads on said ring are wedged against the corresponding threads in said bore to form a locked and solid bearing support for each of said blades.

4,076,454

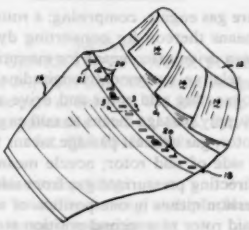
VORTEX GENERATORS IN AXIAL FLOW COMPRESSOR

Arthur J. Wennerstrom, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 25, 1976, Ser. No. 699,929

Int. Cl.² F01D *1/02*

U.S. Cl. 415—208 **1 Claim**



1. In a compressor having an axial flow passage within an outer casing wall and a rotor having a plurality of rotor blades within said passage with said rotor blades being spaced from said wall with a running clearance d_1; a vortex generator system within said flow passage, comprising: an annular channel in the casing wall upstream of said rotor; a support ring in said channel having its inner surface flush with the inner surface of the casing wall; means, supported on said support ring for producing at least three co-rotating vortices in front of each of said rotor blades with the vortices co-acting with the rotor

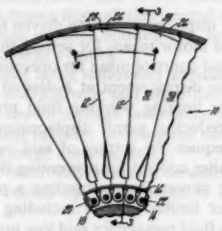
circumferential pressure to deflect the vortices outward toward the casing wall; said vortex generator system includes a plurality of vortex generator blades equal to at least three times the number of rotor blades for producing said co-rotating vortices; said vortex generator blades having a height h greater than d_1 and less than $10d_1$, with a spacing between the blades being greater than $3h$ and less than $10h$; said vortex generator system being spaced from said rotor blades a distance greater than $10h$ with the trailing edge of the rotor being a distance less than $80h$ from the leading edge of the vortex generator system.

4,076,455

ROTOR BLADE SYSTEM FOR A GAS TURBINE ENGINE

Hans Stargardter, Bloomfield, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 28, 1976, Ser. No. 700,693
Int. Cl.² F01D *5/22*
U.S. Cl. 416—191 **9 Claims**



1. In a gas turbine engine a rotor blade system which is adapted for reduced susceptibility to vibratory damage wherein said blade system comprises:

a rotor disk; and

a plurality of rotor blades cantilevered radially outward from the said disk wherein

each blade is pivotally joined to the disk so as to be circumferentially deflectable under bending loads, and

each blade has a shroud extending circumferentially from the airfoil surfaces of the blade into abutting relationship with the shrouds of the adjacent blades

and wherein the natural bending frequency of each blade in the system is less than the 2E frequency at the idle condition of the engine in which the blade system is installed.

4,076,456

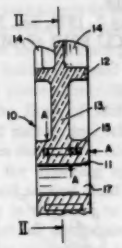
CERAMIC ROTOR FOR GAS TURBINE ENGINE

Dennis Jack Tree, Scottsdale, and F. Michael Tovey, Tempe, both of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Division of Ser. No. 512,817, Oct. 7, 1974, Pat. No. 4,011,295.
This application Apr. 12, 1976, Ser. No. 676,276
Int. Cl.² F01D *5/28*
U.S. Cl. 416—241 B **9 Claims**

1. A ceramic rotor for a gas turbine engine, comprising:

(a) a disk-type body formed of reaction bonded silicon nitride having hub, web and rim regions; and



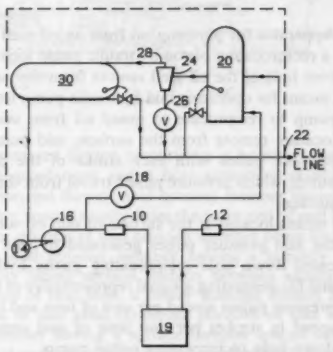
(b) at least one preformed reinforcing ring of hot pressed silicon nitride embedded in the body prior to and integrally joined therewith by the reaction bonding operation.

4,076,457

DOWNHOLE PUMP SPEED CONTROL

David R. Skinner, Odessa; Miles L. Sowell, and Marvin W. Justus, both of Levelland, all of Tex., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sep. 17, 1976, Ser. No. 724,037
Int. Cl.² F04B *49/00*
U.S. Cl. 417—45 **10 Claims**



1. In a well fluid hydraulic pumping system of the type wherein power fluid is used to hydraulically actuate a downhole pump and a portion of the return fluid is conditioned for use as power fluid, the improvement which comprises:

a. two fluid flow monitoring means for generating signals which are a function of power fluid flow rate and return fluid flow rate;

b. flow control means adapted to control the power fluid flow rate and thereby the speed of the downhole pump; and

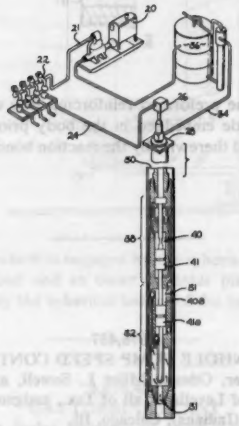
c. an automatic controller having inputs connected to said fluid flow monitoring means and having an output connected to said flow control means, said controller generating an output signal to cause the flow control means to maintain the power fluid flow rate essentially directly proportional to the return fluid flow rate.

4,076,458

AUTOMATIC PUMP SPEED CONTROLLER

Ray L. Jones, Costa Mesa, Calif., assignor to Whittaker Corporation, Burbank, Calif.

Filed May 7, 1975, Ser. No. 575,445
Int. Cl.[2] F04B *49/08, 49/00*
U.S. Cl. 417—46 28 Claims



1. Apparatus for pumping oil from an oil well comprising:

(a) a reciprocating piston hydraulic pump located down the bore hole of the oil well remote from the surface;

(b) means for operating said hydraulic pump for causing said pump to reciprocate to pump oil from said down hole location remote from the surface, said pump generating pressure pulses with each stroke of the piston of said pump, which pressure pulses travel from the pump to the surface;

(c) means located at the surface of said oil well for sensing the said pressure pulses generated by said remotely located down hole reciprocating piston hydraulic pump, and for generating a signal representative of the rate of the pressure pulses sensed per unit of time and thereby of the speed in strokes per unit time of said remotely located down hole reciprocating piston pump;

(d) input means for enabling the selection of a predetermined pumping rate for said pump and for generating a signal representative of the said selected pumping rate in strokes per unit time;

(e) comparator means coupled to said input means and to said signal generating means for comparing said selected pumping rate signal with said actual pumping rate signal and for generating a difference signal representative of the difference between the actual and selected pumping rates; and

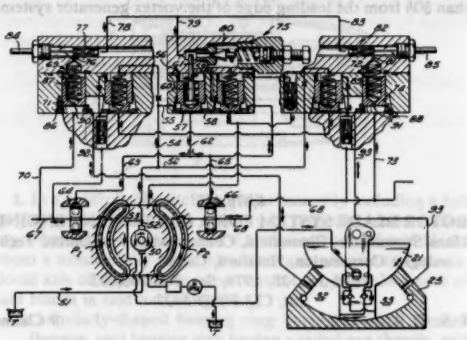
(f) means for adjusting said pumping rate of said pump, said means for adjusting said pumping rate being coupled to said pump and to said comparator means such that when said actual pumping rate differs from said predetermined pumping rate, said means for adjusting said pumping rate is activated and causes said pump to conform to said predetermined rate.

4,076,459

HORSEPOWER LIMITER CONTROL FOR A VARIABLE DISPLACEMENT PUMP

Cecil E. Adams; Leo H. Dillon; Ellis H. Born, and David L. Thurston, all of Columbus, Ohio, assignors to Abex Corporation, New York, N.Y.

Filed Sep. 14, 1976, Ser. No. 723,107
Int. Cl.[2] F04B *49/08*
U.S. Cl. 417—217 11 Claims



1. A variable displacement pump driven by a prime mover, comprising fluid motor means for setting the displacement of the pump, manual conrtrol mean for operating the fluid motor means to set the displacement at a desired value, adjustable valve means for limiting working fluid pressure, means for automatically reducing pump displacement when working fluid pressure equals the setting of said valve means and a horsepower limiter control for preventing the torque required from the prime mover from exceeding a pre-selected value, said horsepower limiter control including a source of low pressure fluid, a fluid passage for said low pressure fluid, means for channeling said low pressure fluid at a selected uniform flow rate through a variable orifice in said fluid passage, said variable orifice creating a variable fluid back pressure upstream of said variable orifice, means for adjusting said variable orifice by movement of the pump displacement varying mechanism, wherein the variable orifice is contoured to provide a variable area such that the low pressure fluid will have a back pressure-pump displacement relationship such that the product of the back pressure times the pump displacement remains constant, including an intensifier piston having one end exposed to the fluid back pressure, second valve means set by said intensifier piston for adjusting the working fluid pressure setting of the first said valve means, said intensifier piston having a constant area ratio such that the product of the first said valve means pressure setting times the pump displacement is constant.

4,076,460

CONVERTIBLE LAWN CARE APPARATUS

Earl O. Roof, 1228 N. Walnut St., Pontiac, Ill. 61764

Continuation of Ser. No. 310,985, Nov. 30, 1972, abandoned.
This application Jul. 19, 1976, Ser. No. 706,441
Int. Cl.[2] F04B *41/00;* B02C *19/12;* F01D *25/00*
U.S. Cl. 417—236 9 Claims

1. A portable, multi-purpose lawn care apparatus for preparing and maintaining lawn areas, which is selectively convertible from a vacuum mode of operation to a blower mode of operation, including:

a chassis mounted on a pair of side wheels;

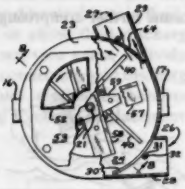
a drive motor mounted on said chassis;

an upright impeller housing fixedly mounted on said chassis, said impeller housing having a generally cylindrical side wall, a back wall and a front wall, said front wall having a central opening formed therein, an upper discharge

opening and a lower discharge opening being formed in said side wall of said impeller housing;

an impeller assembly disposed in said impeller housing, said impeller assembly having a drive shaft operatively connected to said drive motor and rotatable thereby about a central axis of said drive shaft and a plurality of outwardly-extending impeller blades mounted on said drive shaft for rotation therewith about said central axis thereof;

blocking means for selective positioning within said impeller housing, said blcoking means being movable between a first operating position, and a second operating position, to convert said lawn care apparatus from said vacuum mode of operation to said blower mode of operation, said



blocking means being removably mounted, in said first operating position, over said lower discharge opening such that air is drawn through said central opening in said front wall of said impeller housing and directed towards said upper discharge opening;

said blocking means being removably mounted, in said second operating position, over said upper discharge opening such that air is drawn through said central opening in said front wall of said impeller housing and directed towards said lower discharge opening; and,

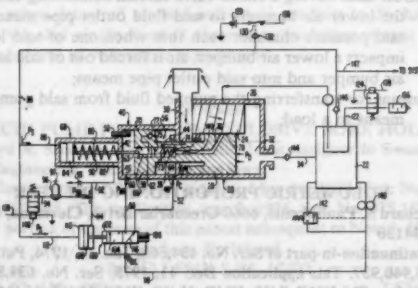
operating means removably mounted on said impeller housing over said central opening formed in said front wall thereof.

4,076,461

FEEDBACK CONTROL SYSTEM FOR HELICAL SCREW ROTARY COMPRESSORS

Harold W. Moody, Jr., Farmington; Clifford T. Bulkley, Glastonbury; Joseph A. L. N. Gagnon, Windsor Locks, all of Conn., and Grover Fraser, Painted Post, N.Y., assignors to Dunham-Bush, Inc., West Hartford, Conn.

Filed Dec. 9, 1974, Ser. No. 531,121
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—310 **18 Claims**



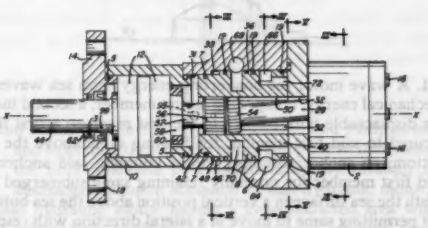
1. In a system for supplying a gas under pressure from a system supply line including a helical screw rotary compressor for compressing said gas from a low pressure at suction to a high pressure at discharge and connected to said line at compressor discharge and having a slide valve for varying compressor capacity by returning a portion of the gas to the suction side of said compressor prior to compression of the same, a first fluid motor for shifting said slide valve to match compressor output to system demand, a source of fluid under pressure, means responsive to system demand for controlling the flow of fluid under pressure from said source to said first fluid motor to effect shifting of said slide valve, and feedback means responsive to slide valve position for modulating said power controlling means to eliminate hunting of said slide valve, the improvement wherein, said power controlling means comprises means for controlling the flow of said fluid between said source and said first fluid motor, and wherein a second fluid motor operatively engages said power controlling means, said system including means for applying system gas from said supply line directly to said second fluid motor to drive said power controlling means in response to system gas pressure variation, said system further comprising a compressed air system, said second motor comprising a linear air motor including a piston slidable within a cylinder and forming with said cylinder, chambers on each side thereof, and said system further including means for subjecting one of said chambers to the system line pressure which varies with system demand, and means for supplying to said other chamber air at a fixed pressure which is normally lower than line pressure.

4,076,462

COMBINED DISTRIBUTOR AND BYPASS VALVE FOR FLUID ACTUATED PUMP OR MOTOR

John J. Pippenger, Acton, Mass., assignor to W. H. Nichols Company, Waltham, Mass.

Filed Jul. 26, 1976, Ser. No. 708,638
Int. Cl.[2] F04B *49/08;* F04C *1/06*
U.S. Cl. 417—310 **15 Claims**



1. A fluid actuated device comprising: a housing member having an elongated open ended bore extending axially inwardly from one end thereof, said housing member having an internal chamber spaced axially from the inner end of said bore with an interior portion of said housing member being located therebetween, said housing member having a laterally and axially inwardly facing surface thereon between axially extending portions of said bore, a rotary member closely rotatively received in said axial extending portions of said bore, said rotary member having a surface thereon spaced axially inwardly of said surface on said housing member to form a bias chamber therebetween, said interior portion having an intermediate opening extending therethrough between said chamber and said bore, an elongated means having one end formed to constitute in conjunction with said chamber a displacement set with said one end being movable through an orbital path, said elongated means having an intermediate portion extending through said intermediate opening and the other end thereof in driving engagement with said rotary member to rotate said rotary member, at least one of said members having fluid supply passageway means and fluid discharge passageway means adapted to be connected to a source of pressurized fluid and a fluid receiving means, respectively, said fluid supply passageway means and said fluid discharge passageway means each extending through said interior portion and at least an adjacent portion of said rotary member to control the supply and discharge of fluid to said displacement set and orbitably rotate said one end of said elongated means, and other passageway means in at least one of said members in fluid flow com-

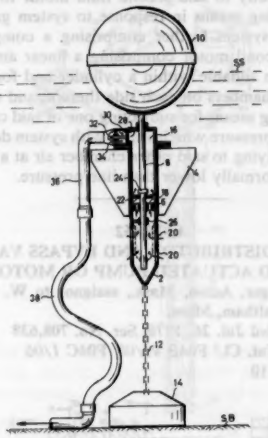
munication with said bias chamber and adapted to be in fluid flow communication with such a source of pressurized fluid to permit fluid from such a source to bias said rotary member into engagement with said interior portion.

4,076,463

WAVE MOTOR

Mordechai Welczer, Busthnai 4, Ramat Hasharon, Israel

Filed Oct. 26, 1976, Ser. No. 735,316
Int. Cl.[2] F04B *35/00*; F03G *7/00*
U.S. Cl. 417—331 **10 Claims**



1. A wave motor for converting energy from sea waves to mechanical energy, comprising: a first member, a second member displaceable with respect to the first member; a first float secured to said first member for floating same above the sea bottom; an anchor; coupling means coupling said anchor to said first member for normally retaining same submerged beneath the sea surface in a vertical position above the sea bottom but permitting same to move in a lateral direction with respect to the sea bottom; and a second float secured to said second member, said second float being of sufficient volume to float on the surface of the sea; whereby wave crests cause said first and second members to move laterally of the sea bottom and said second member to rise with respect to said first member, whereas wave troughs permit said first member to return to its normal vertical position and said second member to descend with respect to said first member, thereby producing mechanical energy by the relative displacement between said first and second members.

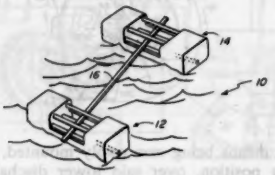
4,076,464

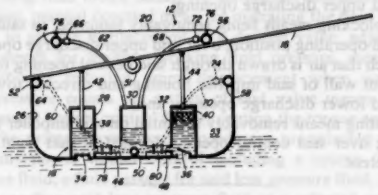
DUAL WAVE MOTION PUMP

Paul E. Pinney, 48 Linden Ave., Lincoln Park, N.J. 07035

Filed Jan. 24, 1977, Ser. No. 761,740
Int. Cl.[2] F04B *17/00*
U.S. Cl. 417—332 **2 Claims**

1. A dual wave motion pump for converting the wave motion of a fluid body into usable energy comprising:
at least two hull structures connected together by means of a lever;
each of said hull structures having at least one enclosed flotation compartment and a partially open pump compartment;
each of said hull structures supporting a lever-activated pumping means in said pump compartment responsive to wave motion;
said pumping means comprising:
a pair of spaced apart cylinders, each of said cylinders having a fluid intake check valve at its base, an outlet means and a reciprocating piston with an elongated shaft operably connected to said lever;
a fulcrum for said lever located between said piston shafts;
a pressure chamber between said cylinders in fluid communication with the outlet means of both of said cylinders through pipe means having check valves therein; and
outlet pipe means from said pressure chamber whereby fluid is delivered to a load;
each end of said lever being pivotally connected to the pump compartment of one said hulls, including means for limiting the upward and downward pivotal motion of said lever, thereby converting the natural wave motion of a fluid body into leverage forces for activating said pumping means;
said pumping means further comprising:





two pairs of longitudinally disposed air bumpers, one pair on each side of said fulcrum, each of said air bumpers having a stiff backing to limit the upward and downward pivotal motion of said lever;
each of said air bumpers having an air intake check valve;
an air hose having check valve therein connecting each of the upper air bumpers to said pressure chamber such that when one end of said lever impacts an upper air bumper, air is forced out of said upper air bumper and into said pressure chamber;
an air hose having a check valve therein connecting each of the lower air bumpers to said fluid outlet pipe means of said pressure chamber such that when one of said lever impacts a lower air bumper, air is forced out of said lower air bumper and into said outlet pipe means;
means for transferring the pumped fluid from said pumping means to a load;

4,076,465

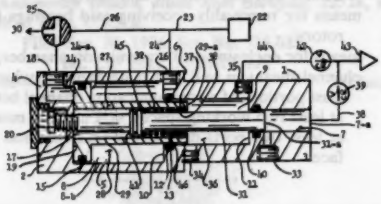
VOLUMETRIC PROPORTIONING DILUTER

Richard S. Pauliukonis, 6660 Greenbriar Drive, Cleveland, Ohio 44130

Continuation-in-part of Ser. No. 434,568, Jan. 18, 1974, Pat. No. 3,940,937. This application Dec. 11, 1975, Ser. No. 639,898
Int. Cl.[2] F01B *7/20*; F04B *35/00*; F15B *15/17, 15/24*
U.S. Cl. 417—339 **7 Claims**

1. A volumetric proportioning diluter comprising:
an elongated housing having first and second ends interconnected by a differential diameter bore passing therethrough, an elongated piston assembly having different diameters that correspond to the diameters of said differential diameter bore is slidably received therein, said piston assembly is movable inside said bore axially,

a pump actuating means for moving said piston assembly in said first housingend separated from and adjacent pumping means for fluid discharge, said pumping means spaced along said housing length toward said second housing end including at least two completely separate fluid chambers adjacent each other and capable of receiving different fluids of distinctly different displacement volumes due to a difference in said piston diameters inside said differential diameter bore, fluid supply and discharge ports in said separate fluid chambers for fluid communication therewith, including directional control means in said fluid supply and discharge ports and a first directional control in said fluid supply ports of said chambers to allow fluid flow into said fluid chambers and not vice versa and a second directional control in said fluid discharge ports of said chambers to allow fluid discharge from said fluid chambers and not vice versa, individual fluid discharge conduit means connecting said discharge ports to a single conduit for fluid discharge therefrom, said pumping means including a volume displacement piston reciprocat-



ing in a chamber pumping concentrate and being carried by said elongated piston assembly for relative axial piston reciprocation therebetween, said displacement piston being slidable therein from a first fluid suction position when said pump actuating means urges said piston assembly to assume a first piston withdrawn position to a second fluid discharge position when said pump actuating means urges said piston assembly to assume a second piston engaged position, thereby providing a simultaneous fluid suction of different volumes into said fluid chambers via said fluid supply ports when said volume displacement piston is moved to said first fluid suction position, and when said volume displacement piston is moved to said second fluid discharge position, resulting in a simultaneous fluid discharge from said fluid chambers via said fluid discharge ports for a dilution thereof in the ratio of respective volumetric proportions of said fluid chambers when delivered via said individual conduits to discharge via said single conduit therefrom, including means for control of volumetric proportions.

4,076,466

FLUID PUMP FOR USE IN EXPLOSIVE BORE HOLES

Floyd R. Swanson, Jr., Cedar Falls, Iowa, assignor to Swanson Engineering, Inc., Cedar Falls, Iowa

Continuation of Ser. No. 361,496, May 18, 1973, Pat. No. 3,989,418. This application Apr. 8, 1976, Ser. No. 675,151

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.[2] F04B *9/08, 17/00*

U.S. Cl. 417—390 **7 Claims**

1. A fluid pump for use in explosive bore holes comprising,

an elongated cylindrical first housing having upper and lower end plates, said first housing having means provided thereon to permit water to enter the interior thereof,

a hydraulic motor having upper and lower ends secured in said housing adjacent the lower end thereof,

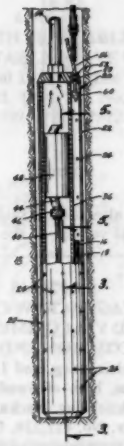
a pump housing extending upwardly from said hydraulic motor within said first housing, said pump housing having a fluid intake opening means located above said hydraulic motor,

a hydraulic hose means in communication with a source of hydraulic fluid under pressure and extending through the upper end plate of said first housing and thence downwardly into said first housing between said first housing and said pump housing, said hose means being fluidly connected to the upper end of said hydraulic motor,

a drive shaft extending upwardly from said hydraulic motor within said pump housing,

a pump stator means positioned in said pump housing,

a pump rotor means connected to said drive shaft for rotation therewith and extending through said pump stator means,



and a discharge line fluidly connected to said pump housing and extending through the upper end plate so that water in the bore hole will be pumped upwardly through said discharge line upon actuation of said hydraulic motor;

said hydraulic motor having a cross-sectional area which substantially conforms to the inner cross-sectional area of said first housing,

said pump housing having a cross-sectional area less than the cross-sectional area of said hydraulic motor and the internal cross-sectional area of said first housing and being eccentrically positioned with respect to the longitudinal axis of said first housing to provide an access space for said hydraulic hose means so that said hose means can extend through said first housing adjacent to said pump housing.

4,076,467

SPECIALLY REINFORCED FLEXIBLE TUBE PUMPING CHAMBER

Jan Edvard Persson, Henriksdalsringen 17[5], 131 00 Nacka, Sweden

Filed Jan. 29, 1976, Ser. No. 653,392

Claims priority, application Sweden, Jan. 31, 1975, 7501054; Apr. 11, 1975, 7504177

Int. Cl.[2] F04B *43/08, 45/06, 11/00*

U.S. Cl. 417—478 **15 Claims**

1. A pump comprising a variable volume operating chamber means, inlet means and discharge means for pumped medium, and valves operable to communicate said chamber means with said inlet means and said discharge means, said variable volume operating chamber means comprising a tubular pump element having a wall formed of an elastomeric material and at least two separate reinforcement systems embedded therein, each of said systems comprising at least one helically wound wire, each of said systems running in opposite directions relative to the axis of said tubular element, said tubular pump element

having means for straining said wall for alternate axial extension and retraction, said extension and retraction causing an

alternating diametral alteration of said wall effecting an overall change of the internal volume of the tubular pump element.

4,076,468

MULTI-STAGE SCREW COMPRESSOR INTERCONNECTED VIA COMMUNICATION CHANNEL IN COMMON END PLATE

Walther Persson, Helsingborg, and Lauritz Benedictus Schibbye, Saltsjo-Duvnas, both of Sweden, assignors to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

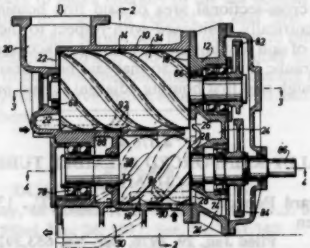
Continuation of Ser. No. 411,224, Oct. 31, 1973, Pat. No. 3,910,731, which is a continuation of Ser. No. 158,176, June 30, 1971, abandoned. This application Jul. 14, 1975, Ser. No. 595,401

Claims priority, application United Kingdom, Jul. 9, 1970, 33405/70

The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.

Int. Cl.[2] F01C *1/16, 11/00;* F04C *23/00*

U.S. Cl. 418—9 **13 Claims**



1. Screw rotor machine for an elastic working fluid comprising:

casing means enclosing at least two working spaces, each generally comprising two intersecting bores with parallel axes and provided with barrel walls, with low pressure and high pressure end walls perpendicular to said axes, and with low pressure and high pressure ports disposed in said walls;

a pair of intermeshing rotors respectively disposed in each working space, each rotor provided with helical lands and intervening grooves having a wrap angle of less than 360°, each pair of intermeshing rotors comprising one rotor of male rotor type and one rotor of female rotor type, said rotors each including bearings mounted thereto; and

a transmission chamber containing a power transmission provided with a power shaft extending externally of said casing means, one rotor of each stage being further interconnected by said power transmission disposed in said transmission chamber;

the improvement wherein the casing means comprises:

means defining at least two barrels immediately adjacent each other and respectively enclosing at least the major portions of said at least two working spaces in parallel side by side, said at least two barrels being rigidly coupled together at least at portions along the length thereof in the axial direction of said working spaces; and

an end plate member directly connected to said means defining at least two barrels, said end plate member having:

one common plane surface defining an end wall of each of said working spaces;

means for removably connecting said end plate member to an end of each of said barrels of said means defining at least two barrels so that said common plane surface defines said end walls of said barrels;

means for removably receiving said bearings for all the rotors;

means for enclosing said transmission chamber; and

channel means in said end plate member which form at least portions of a communication channel between said at least two working spaces, said channel means having at least two ports disposed in said common plane surface.

4,076,469

ROTARY COMPRESSOR

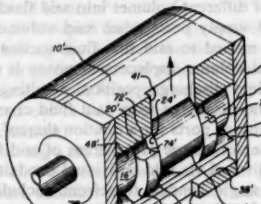
Roger C. Weatherston, Williamsville, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Continuation-in-part of Ser. No. 654,138, Jan. 30, 1976, Pat. No. 4,033,708. This application Jun. 24, 1976, Ser. No. 699,556

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.[2] F04C *13/00, 17/10*

U.S. Cl. 418—9 **12 Claims**



1. A rotary compressor, comprising;

a. a housing defining two working chambers,

b. mating impellers rotatably mounted about an axis in each of said working chambers for rotation in opposite directions,

c. each impeller having two sets of profiles, each set comprised of at least two profiles of constant cross-section,

d. each of said profiles comprised of at least one lobe and at least one well, each well and each lobe being joined by a transition surface.

e. an outlet communicating with said housing,

f. means for supplying fluid at inlet pressure to the wells of each profile during portions of the rotation cycle of each impeller, whereby in one rotational position of said impellers at least one well of each profile on each impeller contains trapped fluid at inlet pressure.

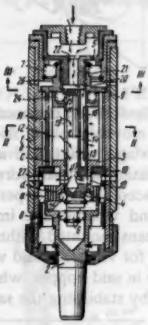
g. at least one profile of each set being out of the plane of said outlet and at least one profile on each impeller being common to each of said sets and at least one profile on each set having its wells in communication with said outlet during one portion of its rotation cycle and blocked from communication therewith during another portion of its rotation cycle, and

h. the lobes and wells of any one profile of each set being angularly displaced from those of the profiles immediately adjacent thereto whereby as said impellers continue to rotate from said one rotational position, said fluid is transferred sequentially from the wells of one profile of each set to the wells of adjacent profiles and experiences an increase in pressure prior to the establishment of communication between said outlet and the wells of said profiles in communication therewith.

4,076,470
PLANETARY AIR MOTOR WITH TWO INTERNAL GEARINGS

Mikhail Danilovich Sur, ulitsa Anri Barbjusa, 22/26, kv. 28, and Daniil Andreevich Dudko, ulitsa Anri Barbjusa, 22/26, kv. 143, both of Kiev, U.S.S.R.

Filed Sep. 30, 1976, Ser. No. 728,023
Int. Cl.² F01C *1/08, 21/12*
U.S. Cl. 418—63 **4 Claims**

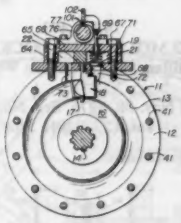


1. A planetary air motor with two internal gearings comprising: a casing; two internally toothed ring gears accommodated in said casing, one of said ring gears being fixed while the other one is rotatable and intended to transmit torque to the shaft of a driven unit; a pinion carrier with a flange and a crescent-shaped plate, said pinion carrier being located in said casing and provided with two concentric journals, an eccentric journal, a main longitudinal channel, an additional longitudinal channel with a smaller bore than that of the main channel, said additional channel being isolated from the main channel and positioned in a diametral plane towards the periphery of said eccentric journal of the pinion carrier; a fixed washer installed in said casing; a two-rim pinion located in said casing and mounted on said pinion carrier; one rim of said pinion meshing with said rotatable ring gear and installed on one of said concentric journals of the pinion carrier; the other rim of said pinion free-mounted on said eccentric journal of the pinion carrier, provided with radial through slots in the tooth spaces; meshing with said fixed ring gear and forming, together with it, a working inter-tooth space; said intertooth working space limited by said flange of said pinion carrier at one face of said fixed ring gear and by said fixed washer at the other face, and divided by said crescent-shaped plate into two intertooth working zones practically isolated from each other, a compressed air line communicating with said additional longitudinal channel; said pinion carrier provided with a slot located in the zone where said fixed ring gear meshes with one of said pinion rims, said slot communicating with said additional channel and being set tangentially to the cross section of said additional channel, having a length equal to the width of said radial through slots in the tooth spaces of said pinion and putting said additional longitudinal channel in communication with one of said intertooth working zones; said pinion provided with side holes located in the zone where said rotatable ring gear meshes with said pinion rim and putting said main longitudinal channel in communication with the atmosphere, and a side port communicating said main longitudinal channel with the other one of said intertooth working zones, said port being located in the zone where said fixed ring gear meshes with said pinion rim, the length of said port being equal to the length of said radial through slots, said port being limited in cross section by a side set at an angle of 120° approximately.

4,076,471
ROTARY ENGINE WITH SEPARABLE ABUTMENT AND ADJUSTABLE VALVE CAM

Troy A. McClure, General Delivery, Los Gatos, Calif. 95030

Filed Jun. 21, 1976, Ser. No. 698,187
Int. Cl.² F01C *19/00, 1/00, 21/12;* F16K *31/524*
U.S. Cl. 418—143 **5 Claims**



1. An engine comprising means forming a toroidal cylinder, a main shaft at the axis of said cylinder, a piston rotatable in said cylinder, means for turning said piston and main shaft together, a main valve in said cylinder, an intake port on one side of said main valve, an outlet port on the side of said main valve opposite said intake port and means for supplying gas under pressure to said intake port, an intake valve controlling said means for supplying gas, a cam shaft having a cam, means rotatably mounting said cam shaft on said engine for axial movement and rotative movement, means driving said cam shaft in time relation to said main shaft, means for adjusting the longitudinal position of said cam shaft, a cam follower, means articulately connecting said cam follower to said intake valve, each said cam having a high dwell with a ramp configuration such that the extent of opening of said intake vavle varies in an axial direction, whereby as said cam shaft is moved longitudinally the duration of opening of said inlet valve is adjusted.

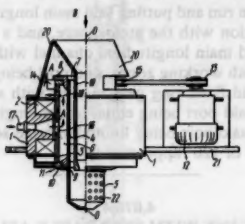
4,076,472
CENTRIFUGAL PELLETIZER

Ivan Andreevich Barannik, prospekt Lenina, 182a, kv. 22; Alexandr Nikolaevich Kachurka, Severo-Koltsevaya ulitsa, 6 kv. 12, both of Zaporozhie; Ivan Vasilievich Zharovsky; Alexandr Fedorovich Trukhin, both of ulitsa Zhdanova, 11, kv. 32, Kalush Ivano-Frankovskoi oblasti; Viktor Georgievich Raskatov, ulitsa Khimikov, 14, kv. 18, Kalush Ivano-Frankovskoi oblasti, and Alexandr Borisovich Mazurkevich, ulitsa B.Khmelnitskogo, 22, kv. 19, Kalush Ivano-Frankovskoi oblasti, all of U.S.S.R.

Filed Dec. 1, 1976, Ser. No. 746,308
Claims priority, application U.S.S.R., Dec. 4, 1975, 2196201
Int. Cl.² B29C *5/04*
U.S. Cl. 425—8 **2 Claims**

1. A centrifugal pelletizer, comprising: a housing with bearings; a hollow drive shaft vertically mounted in the bearings inside said housing; a hollow transmission shaft accommodated in said hollow drive shaft so as to define an annular gap be-

tween said transmission shaft and said drive shaft, openings being provided in the drive shaft at the point of its interconnection with the transmission shaft to allow a fluid coolant to pass



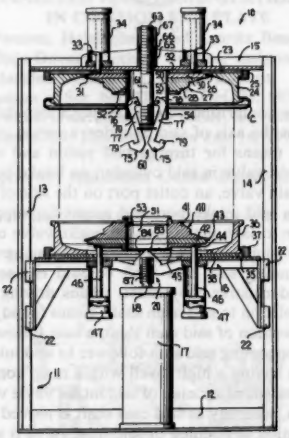
to and let out from the annular gap, a top end of said transmission shaft being rigidly coupled with said drive shaft; a perforated bowl mounted on the bottom end of said transmission shaft; and means for rotating said drive shaft.

4,076,473

RETREAD MOLD WITH LOCKING MEANS

Kenneth T. Macmillan, 4992 Wesleyan Woods Dr., Macon, Ga. 31204

Filed Nov. 30, 1976, Ser. No. 746,120
Int. Cl.[2] B29H *5/04*
U.S. Cl. 425—19 **25 Claims**



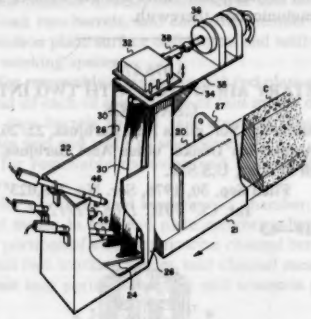
1. A retread mold comprising first and second platens, means for imparting relative movement to said platens between open and closed positions, a first matrix carried by said first platen, a second matrix carried by said second platen, said matrices defining an annular chamber adapted to receive a tire when said platens are in the closed position thereof, a first bead wheel carried by said first platen, a second bead wheel carried by said second platen, a mandrel carried by said first platen and projecting toward said second platen, said first and second bead wheels having respective first and second openings therein for telescopically receiving said mandrel in the closed position, locking means for locking said first platen to said second bead wheel, said locking means including a support member at least partially housed in said mandrel, at least one locking arm movably carried by said support member, said locking arm being movable between a first unlocked position in the open position of said platens and a second locked position in the closed position of said platens, said locking arm having a terminal end for engaging a portion of said second bead wheel in an area axially beyond any radial plane through said annular chamber, said locking arm extending through said second opening in said second locked position, and said terminal end being positioned further from the axis of said annular chamber in said locked position than in said unlocked position.

4,076,474

SLIP FORM FOR CONCRETE

Gerald Anthony Catenacci, 44 Golfvalley Lane, Toronto, Ontario, Canada

Filed Feb. 22, 1977, Ser. No. 771,170
Int. Cl.[2] B29F *3/00*; B28B *13/02*; E01C *19/48*
U.S. Cl. 425—64 **8 Claims**



1. Apparatus for slip-forming of concrete, of the type having a carriage means movable along a substrate, formwork mounted on the carriage means, and a hopper for receiving concrete, communicating with said form means whereby said concrete may be placed in said hopper and will then pass to said form means, and wherein the improvement comprises water extraction means mounted within said hopper, and vibrator motor means for vibrating said water extraction means within said concrete in said hopper, whereby to extract water from concrete thereby stabilising the same.

4,076,475

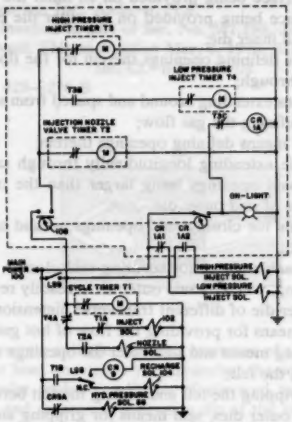
PRESSURE INJECTION MACHINE AND METHOD

Raymond L. Trueblood, New Carlisle, Ohio, assignor to Trueblood, Inc., Tipp City, Ohio

Continuation of Ser. No. 518,234, Oct. 29, 1974, abandoned, which is a division of Ser. No. 343,903, March 22, 1973, abandoned. This application Aug. 27, 1976, Ser. No. 718,399
Int. Cl.[2] B29F *1/06*
U.S. Cl. 425—159 **2 Claims**

1. Apparatus for the injection molding of plastic into a mold cavity, comprising an injection cylinder and a hydraulically operated reciprocating ram screw therein, an injection nozzle on said injection cylinder having a controllable nozzle shutoff valve, hydraulic source means providing two fluid pressures to said ram, valve means connected intermediate said hydraulic source means and said ram for selectively applying said fluid pressures to move said ram screw with correspondingly different forces to create a corresponding pair of plastic injection pressures, first timer means establishing a first time interval controlling said valve means to apply a first of said fluid pressure to the injection screw at the beginning of said first interval, a nozzle timer initiated simultaneously with said first timer means and connected to hold said nozzle valve closed for a predetermined short time interval followed by opening said nozzle valve at the conclusion of said short time interval, said first timer means maintaining said first pressure throughout said first time interval to effect injection of the plastic material at said first injection pressure, second timer means establishing a second time interval longer than the intervals of said first timer means and said nozzle timer, said second timer means

initiated by the timing out of said first timer means and connected to operate said valve means to apply and maintain the



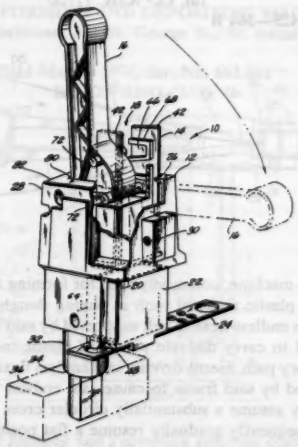
second of said fluid pressures to said screw throughout said second time interval to prevent shrinkage of the plastic within the mold cavity.

4,076,476

DOUGH MOLD PRESS

Frank D. Ventura, Commack, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,840
Int. Cl.[2] B29F 3/00
U.S. Cl. 425—183 11 Claims



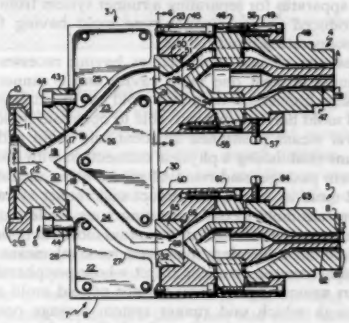
1. A toy extrusion device for use with a moldable material comprising a housing, a container defining an extrusion chamber movably mounted in said housing for movement between first and second positions these positions corresponding to extrusion and loading positions and said container having opposed end portions respectively defining an extrusion opening and a filling opening therein, a plunger slidably mounted in said housing and positioned to enter the filling opening of said container in the first position thereof to urge moldable material in the extrusion chamber through said extrusion opening, and a manually operable lever pivotally mounted on said housing, said plunger and lever having cooperating means which comprise two pairs of slots formed in said plunger, slots of each pair being formed in opposite sides of said plunger and extending generally perpendicularly of the path of travel thereof, said pairs of slots being spaced from one another along the plunger in the direction of movement thereof, and two pairs of arcuately spaced pins on said lever respectively associated with said slots and located to sequentially enter and be engaged in their associated slots during pivotal movement of the lever whereby the plunger is moved in a linear direction upon pivotal movement of the lever and the plunger may be reciprocated into and out of said extrusion chamber.

4,076,477

MULTIPLE EXTRUSION APPARATUS

Gerhard A. Hacke, Acton, Canada, assignor to Grandview Industries Limited, Canada

Filed Dec. 8, 1975, Ser. No. 638,459
Int. Cl.[2] B29F 3/06
U.S. Cl. 425—192 R 4 Claims



1. In apparatus for simultaneously forming two products from heat-plastified polymeric material supplied from a single supply orifice such as that at the delivery end of an extruder barrel, the combination of

distribution manifold means adapted to be mounted to receive the heat-plastified polymeric material from the supply orifice, said manifold means defining

at least two forwardly diverging flow passages having a common inlet to communicate with the supply orifice, said flow passages being of the same flow capacity; and

a plurality of die assemblies equal in number to said flow passages, each of said die assemblies comprising

an annular adapter body secured to the forward end of said manifold means in registry with the outlet of one of said flow passages,

an annular die body mounted on the adaptor body and arranged to receive the heat-plastified polymeric material flowing through the adapter body,

means operatively associated with said die assembly for securing the die assembly to the forward end of the manifold means,

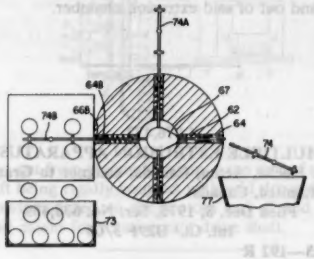
said adapter body having a rearwardly opening cavity, and

a replaceable annular flow control insert disposed in said rearwardly opening cavity of the adapter body and communicating between the corresponding one of said flow passages and the interior of the die body; said flow control inserts being so dimensioned and of such shape that the pressure drop across the entire die assembly, including the flow control insert, is the same for all of the die assemblies.

4,076,478
MEANS FOR REMOVING A MOLDED COMPONENT FROM A MOLDING MACHINE

John H. Rossio, Portage, Mich., assignor to LaRos Equipment Company, Inc., Portage, Mich.

Filed Jul. 3, 1975, Ser. No. 592,808
Int. Cl.[2] B29F 1/14
U.S. Cl. 425—215 9 Claims



1. An apparatus for separating a runner system from molded parts produced in an injection-type mold having first and second cooperating mold halves;

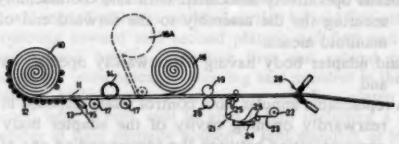
at least one of said mold halves having recesses therein defining at least one mold cavity and a runner system passage connected with said mold cavity, at least one of said mold halves being movable to open said mold cavity;

removal means positioned adjacent said mold and having means establishing a physical connection with said runner system passage, said removal means being operable after said mold is opened to conduct said runner system away from said mold to one collecting zone while the molded parts are permitted to exit from said mold for collection in a different collecting zone, said removal means being a center-mounted rotatable turret whose peripheral surface bears against a peripheral surface of said mold at a port through which said runner system passage opens, said turret carrying a plurality of radially positioned circumferentially spaced openings in its peripheral surface, and a corresponding plurality of rods normally recessed in said openings, and actuating means causing said rods to shift radially outward in said openings successively as the latter attain a preselected discharge position in their orbital movement spaced away from said port.

4,076,479
APPARATUS FOR FORMING ARTICLES OF FIBROUS MATERIALS

John W. Lacon, Sarnia, Canada, assignor to Fiberglas Canada Ltd., Toronto, Canada

Continuation-in-part of Ser. No. 607,963, Sep. 26, 1975, abandoned, which is a division of Ser. No. 346,381, Mar. 30, 1973, Pat. No. 3,912,572. This application Jan. 11, 1977, Ser. No. 758,512
Claims priority, application Canada, Feb. 1, 1973, 162625
Int. Cl.[2] B29C 3/04
U.S. Cl. 425—301 22 Claims



1. Apparatus for forming articles from a longitudinally advancing strip-shaped felt of fibrous material containing hardenable bonding material, said apparatus comprising:

inner and outer stationary forming surfaces spaced apart for receiving the felt therebetween in sliding contact with said forming surfaces at opposite sides of the felt;

said inner surface being provided on an inner die and said outer surface being provided on an outer die extending around said inner die;

said outer die defining openings therein for the flow of hot gas therethrough;

housing means extending around and spaced from said outer die for confining the gas flow;

said housing means defining openings therein;

said outer die extending longitudinally through said openings and said openings being larger than the transverse dimensions of said outer die;

closure means for closing said openings around said outer die;

readily releasable means for securing said closure means to said housing, whereby said outer die is readily replaceable by an outer die of different transverse dimensions;

gas supply means for providing the flow of hot gas through said housing means and said outer die openings to the felt for curing the felt;

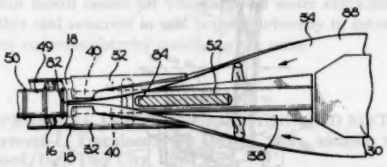
means for gripping the felt and pulling the felt between said inner and outer dies, said means for gripping and pulling being disposed beyond said outer die in the direction of advance of the felt; and

means for cutting the felt into separate lengths, said means for cutting being disposed beyond said means for gripping and pulling in the direction of advance of the felt.

4,076,480
MANDREL DESIGN FOR BAGEL MAKING MACHINE

John Francis Marano, Rosemead, Calif., assignor to Kotten Machine Co. of Calif. Inc., South El Monte, Calif.

Filed Aug. 9, 1976, Ser. No. 712,599
Int. Cl.[2] A21C 11/00
U.S. Cl. 425—364 B 4 Claims



1. In a machine, commonly used for forming a toroid from a lump of plastic material such as baking dough, comprising a frame, an endless flexible belt supported by said frame, said belt operated to carry discrete pieces of plastic material along a translatory path, means driving said endless flexible belt, means supported by said frame to cause said endless flexible belt to gradually assume a substantially circular cross sectional form and subsequently gradually resume a flat position, a pressure plate for forming said lump of plastic material into a cylindrical, a mandrel supported centrally above the endless flexible belt and extending axially into the cylindrically shaped portion of the belt, the improvement comprising;

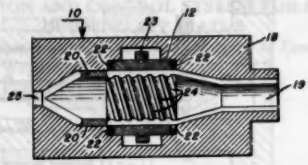
a tapered plate having a flat bottom and a wide end wider than the diameter of said mandrel and a narrow end, said tapered plate being supported above the endless belt such that the plastic material encounters the wide end of the tapered plate first; said tapered plate gradually fairing into the shape of the underside of the mandrel at the narrow end of the tapered plate such that the mandrel and tapered plate combination present a smooth surface to the plastic material as it moves beneath the tapered plate and mandrel joint.

4,076,481

ANNULAR EXTRUSION DIE

Leonard F. Sansone, Andover, N.J., assignor to Sussex Plastics Engineering, Inc., Andover, N.J.

Continuation-in-part of Ser. No. 541,198, Jan. 15, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 664,905
Int. Cl.[2] B29D *23/04*
U.S. Cl. 425—376 B 15 Claims



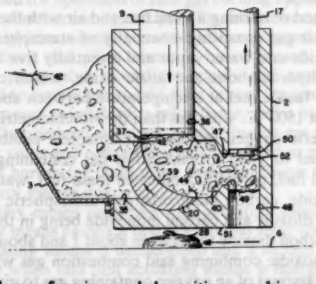
1. In a screw extruder for melt extrusion of a polymer, comprising at least one screw for advancing the polymer through the extruder under conditions of elevated temperature and pressure and an annular extrusion die at the outlet of the extruder having an annulus formed between an inner mandrel member and a surrounding outer die member, the improvement which comprises polymer pumping and shearing means spaced from the outlet of said extrusion die comprising shear ring means mounted on at least one of said members and rotatable about the common longitudinal axis of said members, said shear ring means having a surface facing said annulus and spaced from and opposed to a surface of the other of said members, and at least one helical groove is provided in at least one of said surfaces, the outer die member and the inner mandrel member being stationary at the outlet of said extrusion die.

4,076,482

CHARGE FORMING AND DEPOSITING MACHINE

Henry M. Whetstone, 282 St. George St., St. Augustine, Fla. 32084

Filed Mar. 4, 1976, Ser. No. 663,901
Int. Cl.[2] B29C *23/00*
U.S. Cl. 425—437 5 Claims



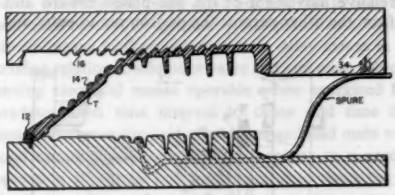
1. A charge forming and depositing machine comprising a hopper, a body having a chamber therein, a movable element exposed to the interior of said chamber for expanding and contracting said chamber, a valve connecting said hopper with said chamber, said body further defining an upright cylindrical cavity therein having an open lower end and a side port communicating with said chamber, a piston in said cylindrical cavity, said piston having an operative face at its lower end and being movable downwardly from a retracted position, with said port open into said cavity below said piston face, into an extended position, with said port closed by said piston and with said face disposed outwardly below said open end of said cavity, and sequential operating means operatively associated with said valve, with said moveable element and with said piston for opening said valve between said hopper and said chamber and for expanding said chamber, for thereafter closing said valve between said hopper and said chamber and for contracting said chamber while said valve is closed and said piston is in its said retracted position, for subsequently moving said piston downwardly from its said retracted position thereby to close said port and into its said extended position with its said face below said open lower end, and for thereafter retracting said piston into its said retracted position.

4,076,483

APPARATUS FOR EJECTING MOLDED ARTICLE

Frank S. Smirne, 1240 Washington St., Whitehall, Pa. 18052

Filed Jan. 24, 1977, Ser. No. 761,600
Int. Cl.[2] B29F *1/14;* B29C *7/00;* B29H *7/08*
U.S. Cl. 425—444 5 Claims



1. In apparatus for molding a finished article of plastic in the form of a unitary sole and heel member, which apparatus comprises first and second cooperable mold members, said mold members when operatively joined together define a molding cavity, access means to said molding cavity for supplying a heat curable plastic material to said molding cavity for molding, and means to move said mold members relative to one another from a position of operativeness to a position of inoperativeness, the improvement comprising in combination therewith the provision of an adjustable ejector pin projecting from one of said mold members into said molding cavity a predetermined depth, such that when said mold members are operatively joined together and plastic material is supplied to said molding cavity said plastic material will form about said ejector pin, said ejector pin characterized by a head portion which is adapted to grip the molded finished article and peel such finished article from a mold member when said mold members are moved to a position of inoperativeness, and characterized further in that said head portion is provided with a beveled shoulder capable of gripping without tearing the molded finished article upon removal from the mold member.

4,076,484

INJECTION-BLOW MOLDING MACHINE HAVING NON-SPLITTING INJECTION AND BLOW MOLDS

Donald F. Armour, Bloomfield, Conn., and Bernie A. Olmsted, East Longmeadow, Mass., assignors to Hercules Incorporated, Wilmington, Del.

Filed Nov. 10, 1975, Ser. No. 630,745
Int. Cl.[2] B29D *23/03*
U.S. Cl. 425—525 16 Claims

1. An injection blow molding machine for forming a container having a neck dimensionally smaller than the body of the container comprising:

a first platen and a second platen supported in generally parallel relationship with each other;

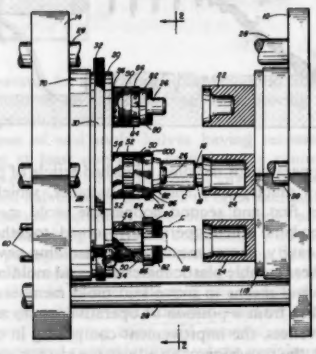
means mounted in the machine operable to move one of the platens toward and away from the other;

means mounted in the machine operable to rotate one of the platens relative to the other about a machine axis perpendicular to the two platens;

an injection mold and a blow mold mounted on the first platen, with the mold axes parallel to and spaced equidistant from the machine axis and having mold cavities extending along the mold axes, the cavities having mouths at

the openings of the cavities facing the second platen, bottoms of the cavities opposite the mouths and side walls extending between the mouths and the bottoms, at least the side walls of the mold cavities between the mouths and the bottoms of the cavities being formed by non-splitting mold portions secured to the first platen, the dimensions of the mouths of the cavities being at least as large as the parallel dimensions at any section of the respective mold cavities between the mouth and the bottom to allow a parison or blown container to be axially removed from the non-splitting molds through the mouths;

a parison pin for the molds mounted on the second platen projecting toward the first platen with the pin axis parallel to the machine axis and spaced from the machine axis by the same amount as the mold axes whereby rotation of the platens relative to one another brings the parison pin axis and one or the other of the mold axes into alignment and relative movement of the one platen toward and away from the other permits the parison pin to enter and withdraw from the openings of one or the other of the molds and thus a parison may be carried by the pin from the injection to the blow mold; and



a set of split neckring segments mounted on the second platen about the parison pin and cooperating with the pin to define a neck portion of a container having dimensions perpendicular to the mold axis smaller than the corresponding dimensions of the container at the mouth of the cavity in the blow mold, the neckring segments being movable on the second platen relative to the parison pin between opened and closed positions to release the blown container, the segments cooperating with the injection mold to define the neck portion of the parison between the mouth of the injection mold and the finish of the parison and cooperating with the blow mold to define the narrower portion of the blown container between the mouth of the blow mold and the finish of the container whereby the neckring segment engaging a blown container at a blow mold remove the blown container from the mold when one of the platens is moved away from the other.

4,076,485

SHUT-OFF VALVE FOR PLASTIC MELT INJECTION

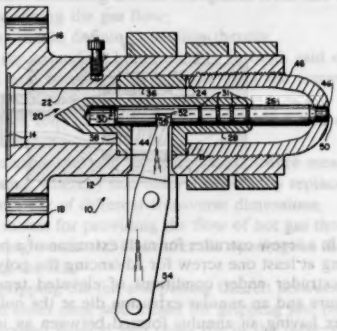
Nickolas N. Sokolow, Cheshire, Mass., assignor to Beloit Corporation, Beloit, Wis.

Filed Jun. 23, 1976, Ser. No. 699,347

Int. Cl.[2] B29F *1/04*

U.S. Cl. 425—562 **14 Claims**

3. A plastic molding apparatus of the type comprising a plastic melt injection apparatus and an injection mold, wherein the improvement comprises a valve means having a passageway providing communication between said injection apparatus and said mold, said valve means including an inlet end and an outlet end, a rod positioned in said passageway between said inlet end and said outlet end, the downstream end of the rod cooperating with the outlet end of the valve to permit or cut off flow of plastic melt therethrough, and a housing in which said rod is slidably mounted, said housing having a rear upstream end and a front downstream end, the rear upstream end being located in the passageway between the inlet end and the outlet end, said housing having a single leg, fixedly attached thereto and extending therefrom transverse, relative to the



direction of flow of the plastic melt, supporting said housing in said passageway, the remainder of the space about the housing, other than the space taken up by the said leg, being open to provide a single, undivided flow path about the housing such that the plastic melt flows from a point upstream of the upstream end of the housing, past the housing itself to the said outlet end, without severing the body of plastic melt passing therethrough into more than one continuous body.

4,076,486

METHOD OF BURNING A FOSSIL FUEL

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 556,670, March 10, 1975, Pat. No. 3,976,599, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,885,020. This application Aug. 5, 1976, Ser. No. 711,999

Int. Cl.[2] F23D *13/20*

U.S. Cl. 431—5 **3 Claims**

1. A method of burning a fossil fuel and air with the emission of an exhaust gas consisting essentially of atmospheric gases, carbon dioxide and water vapor and essentially free of carbon monoxide, hydrocarbons and nitric oxide, which comprises burning the fossile fuel at a temperature between about 1000° C. and about 1500° C. with less than the stoichiometric amount of atmospheric oxygen required for complete combustion of the fossil fuel to yield a combustion gas containing uncombusted fossil fuel, partially combusted fossil fuel, water vapor, carbon dioxide, carbon monoxide, and atmospheric nitrogen, said carbon dioxide and carbon monoxide being in the ratio of 100 parts carbon dioxide to between about 1 and about 11 parts carbon monoxide; combining said combustion gas with a predetermined amount of an oxygen containing gas to give at least a 1% excess of the stoichiometric amount of oxygen for oxidizing the uncombusted and partially combusted fossil fuel and carbon monoxide; and passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 200° C. and about 1000° C.

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m)}$$

wherein:

W is zirconium, tin or thorium, or mixture thereof;

X is an alkaline earth metal or mixture thereof;

J is scandium, yttrium, a rare-earth element or mixture thereof;

Z is a metal of the first transition series or a mixture thereof,

at least 0.01% of said metal having an oxidation state other than +3;

k is a number having a value between 0 and about 0.1;

m is a number having a value of from 0 to about 0.26; and

n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value between 0 and about 0.05.

4,076,487

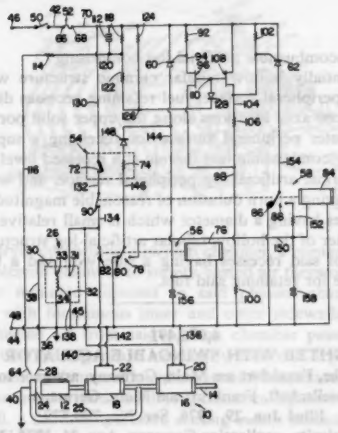
IGNITION AND CONTROL SYSTEM FOR GAS BURNING APPARATUS

Richard D. Stoneking, Corunna, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Dec. 27, 1976, Ser. No. 754,490

Int. Cl.² F23N 5/24

U.S. Cl. 431—25 **5 Claims**



1. A fail-safe, self-checking ignition and control system for a gas burning apparatus or the like that includes voltage supply means for supplying electrical energy from an electric power source for energization of said ignition and control system upon a need for operation of said gas burning apparatus, a main burner, a pilot burner, a gas supply for said burners, electrically operated ignition means operative when energized to ignite gas flowing from said pilot burner, a biased closed, electrically operated pilot valve in said gas supply and operative when energized to supply gas to said pilot burner for ignition by said ignition means to establish a pilot flame, and a biased closed, electrically operated main valve receiving its gas supply from said pilot valve and operative when energized to supply gas to said main burner for ignition by said pilot flame; said ignition and control system comprising:

first relay means including first actuating means, said first relay means having a first operational state when said first actuating means is deenergized and a second operational state when said first actuating means is energized;

second relay means including a second actuating means, said second relay means having a first operational state when said second actuating means is deenergized and a second operational state when said second actuating means is energized;

flame detecting means having first solid state switching means for controlling the energization of said first relay actuating means and second solid state switching means for controlling the energization of said second relay actuating means and including flame sensing means coupled to said two solid state switching means for rendering said first solid state switching mens conductive in the absence of flame at said pilot burner and for rendering said second solid state switching means conductive in the presence of flame at said pilot burner;

first and second power terminals connected to said voltage supply means by means including a circuit breaker responsive to the current flowing between said terminals and opening to disrupt the current flow between said terminals when said current exceeds a predetermined value;

first circuit means including means controlled by said second relay means in said second state thereof for connecting said pilot valve and said ignition means to said voltage supply means to effect energization of said pilot valve and said ignition means whereby said pilot valve permits fuel to issue from said pilot burner and be ignited by said ignition means, said first circuit means also including means controlled by said first relay means in said first state thereof for connecting said main valve to said voltage supply means when said second relay means is in said second state thereof to effect energization of said main valve whereby said main valve permits fuel to issue from said main burner for ignition by said pilot flame, said first circuit means further including time delay means in controlling relation to said pilot valve and said main valve and having electrical means operable when energized for a predetermined time interval to cause said time delay means to deenergize said pilot valve and said main valve;

second circuit means operative in response to a need for operation of said gas burning apparatus to check the nonshorted condition of said time delay actuator means prior to opening of said pilot valve including means controlled by said first relay means in said first state thereof connecting said time delay actuator means in series with said first solid state switching means to said power terminals to cause a current flow effecting opening of said current breaker when said time delay actuator means has a shorted condition;

third circuit means operative in response to a need for operation of said gas burning apparatus to check the non-conductive state of said second solid state switching means prior to said opening of said pilot valve including means controlled by said second relay means in said first state thereof connecting said second solid state switching means to said power terminals to cause a current flow effecting opening of said circuit breaker when said second solid state switching means is in a conductive condition;

fourth circuit means operative in response to a need for operation of said gas burning apparatus to check the conductive state of said first solid state switching means prior to opening of said pilot valve and to energize said first relay actuating means including means connecting said first solid state switching means and said first relay actuating means in series to said power terminals;

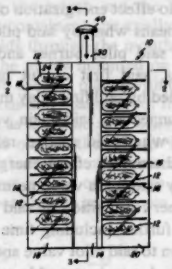
fifth circuit means operative in response to a need for operation of said gas burning apparatus to check the continuity of said time delay actuator means prior to opening of said pilot valve including means controlled by said first relay means in said second state thereof connecting said first solid state switching means, said time delay actuator means and said second relay actuating means in series to said power terminals to effect energization of said second relay actuating means when said time delay actuator means has a continuate condition and to thereafter maintain said time delay actuator means and said second relay actuating means energized while said first solid switching means remains in a conductive condition; and

sixth circuit means for maintaining said second relay actuating means energized after establishment of said pilot flame including means controlled by said second relay means in said second state thereof connecting said second relay actuating means and said second solid state switching means in series to said power terminals.

4,076,488
SELECTIVE FIRING MECHANISM FOR ARRAY OF PERCUSSIVE FLASHLAMPS

Harold H. Hall, Jr., Marblehead, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jun. 14, 1976, Ser. No. 696,146
Int. Cl.² F21K 5/02
U.S. Cl. 431—93 17 Claims



1. A selective firing mechanism for a flashlamp assembly including a plurality of percussively ignitable flashlamps mounted in a row on a support member; the selective firing mechanism comprising, in combination:
- a longitudinal channel in said support member located parallel to said row of flashlamps;
- a spring loaded ratchet bar retained in said channel;
- a single slidable member retained in said channel in releasable engagement with said ratchet bar; and,
- a single striker means provided on said slidable member for resiliently engaging all of said flashlamps successively and operative to sequentially fire respective ones of said flashlamps in response to successive actuation of said ratchet bar and the resulting indexing of the slidable member releasably engaged therewith along said channel.

4,076,489
METHOD FOR COATING PHOTOFLASH LAMPS

Siegfried H. Schroeter, Schenectady; Donald A. Bolon, Scotia, and Gary M. Lucas, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

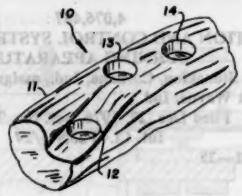
Continuation of Ser. No. 669,474, Jun. 24, 1976, abandoned, which is a continuation-in-part of Ser. No. 592,194, Jul. 1, 1975, abandoned. This application May 2, 1977, Ser. No. 792,924
Int. Cl.² B05D 1/18, 3/06; F21K 5/02
U.S. Cl. 431—94 12 Claims

1. A method for coating a flashbulb with an organic resin to substantially improve its shatter resistance upon flashing while not substantially altering the spectral balance of the light transmitted within the range of 360 nm to about 680 nm and between the blue region of 360 nm to 480 nm, the green region of 480 nm to 560 nm and the red region of 560 nm to above 680 nm which comprises,
- (A) dipping the flashbulb in a UV curable solventless organic resin having a viscosity in the range of 100 to 10,000 centipoises at dipping temperatures,
- (B) pulling the flashbulb from the UV curable solventless organic resin within a period of between 3 to 60 seconds, and
- (C) thereafter effecting the cure of the UV curable solventless organic resin by irradiating the treated flashbulb with UV irradiation, where the UV curable solventless organic resin can transmit at least 70% of the radiant energy in the region of 375 nm and at least 80% of the radiant energy in the region of 400 nm when measured as a 10 mil thick cured film on a glass slide in a recording spectrophotometer.

4,076,490
FIREPLACE SYSTEM

Gloria D. Hilker, 1109 S. Landmark Trail, Hopkins, Minn. 55343

Filed Dec. 1, 1976, Ser. No. 746,387
Int. Cl.² A41G 1/00
U.S. Cl. 431—125 4 Claims

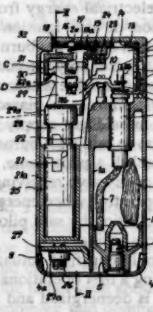


1. A noncombustible artificial log comprising
- a substantially hollow tubular ceramic structure with an outer peripheral surface, fuel retaining recesses disposed at spaced axial locations along the upper solid portion of said outer peripheral surface for receiving a supply of readily combustible fuel therein at a recessed level below the normal artificial log peripheral surface, and with the fuel having a burn duration of reasonable magnitude, said recesses having a diameter which is small relative to the diameter of the hollow tubular artificial log structure and each of said recesses having a side wall and a bottom surface for retaining said fuel.

4,076,491
LIGHTER WITH SWINGABLE ACTUATOR

Walter Mohr, Frankfurt am Main, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 29, 1976, Ser. No. 700,779
Claims priority, application Germany, Aug. 21, 1975, 2537215
Int. Cl.² F21H 7/00
U.S. Cl. 431—130 18 Claims



1. A lighter comprising:
- a housing formed with a fuel tank;
- a burner valve on said housing communicating with said tank for discharging a jet of flammable fuel;
- a piezoelectric igniter in said housing having a movable part linearly displaceable to generate a discharge igniting said jet;
- a swingable actuator on said housing and forming part thereof for operating said valve and said igniter; and
- a force-transmitting device between said actuator and said movable part of said igniter, said device comprising a body, a curved-track element and a rolling running along said curved-track element, one of said elements being mounted on said actuator and the other of said elements

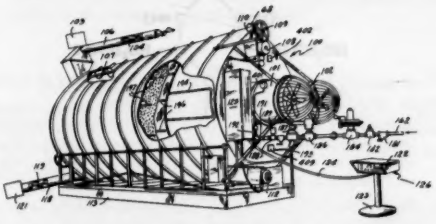
being mounted on said body, said body bearing against said part to transform angular displacement of said actuator into linear displacement of said part, and a further rolling element riding along a wall of said housing.

4,076,492

ELECTRONIC DRYER

Erhardt E. Alms, Barrington; Donald P. DeVale, Sycamore, and William Russell, Genoa, all of Ill., assignors to AFE Industries, Inc., Lake Zurich, Ill.

Filed Dec. 27, 1976, Ser. No. 754,353
Int. Cl.[2] F27B 9/40; F26B 17/16
U.S. Cl. 432—43 15 Claims



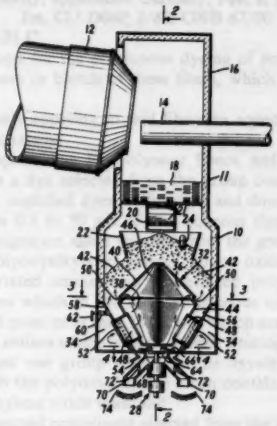
1. A dryer comprising a plenum chamber, a burner mounted in said plenum chamber to supply heated air thereto, a drying chamber mounted adjacent to said plenum chamber and formed with foraminous inner and outer sidewalls through which heated air from said plenum chamber passes, a first temperature sensing means mounted within said drying chamber adjacent said inner side wall, a second temperature sensing means mounted within said drying chamber adjacent said outer side wall, a third temperature sensing means mounted within said plenum chamber and connected to said burner to control it, and a first differential amplifier connected to said first and second temperature sensing means and producing a first output when the temperature difference between said first and second temperature sensing means exceeds a predetermined amount and producing a second output when said temperature difference between said first and second temperature means does not exceed said predetermined amount and said differential amplifier connected to said burner to prevent it from turning on when said differential amplifier produces said second output.

4,076,493

APPARATUS FOR COOLING PARTICULATE MATERIAL

Kenneth L. Gardner, Riverside, Pa., assignor to Kennedy Van Saun Corporation, Danville, Pa.

Filed Sep. 9, 1976, Ser. No. 721,673
Int. Cl.[2] F27D 15/02
U.S. Cl. 432—77 37 Claims



28. An apparatus for cooling hot, calcined particulate material comprising a housing having a cooling chamber therein for receiving and cooling the hot, calcined particulate material, an air distributor located within the cooling chamber below the upper region into which the particulate material is introduced, a discharge passage from the lower region of the housing, an annular flow passage within the cooling chamber around the outer periphery of said air distributor and connecting the upper region of the cooling chamber with the discharge passage, an upper section of said annular flow passage being defined in part by a downwardly and outwardly sloped surface of the air distributor, a lower section of said annular passage extending from the outer perimeter of said outwardly and downwardly extending surface of the air distributor toward said discharge passage and means for introducing a cooling fluid into said annular flow passage at a point at which the upward flow offers less resistance than the downward flow to generate a countercurrent flow of cooling fluid through the upper section of the annular flow passage.

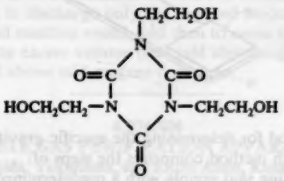
4,076,494

ORGANIC COMPOUNDS

Johann Schuster, Basel, and Karl Taubert, Ettingen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Nov. 3, 1976, Ser. No. 738,568
Claims priority, application Switzerland, Nov. 10, 1975, 14492/75
Int. Cl.² D06P *1/68;* C09D *11/04*
U.S. Cl. 8—2.5 A 17 Claims

1. A composition suitable for use in transfer printing inks which comprises, in intimate admixture, a disperse dye or dispersion optical brightener sublimable at a temperature of 180° to 220° C., or a mixture of such a dye and optical brightener, and, as a dispersing aid, a compound of the formula



4,076,495

SULPHURIZED PAPER SUPPORTS

Robert Décombe, Ferney-Voltaire, and Bernard Hugelin, Gaillard, both of France, assignors to Sublistatic Holding SA, Glaris, Switzerland

Continuation of Ser. No. 486,836, Jul. 9, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,703
Claims priority, application Switzerland, Jul. 12, 1973 10/53
Int. Cl.² D06P *5/20*
U.S. Cl. 8—2.5 A 9 Claims

1. In a temporary carrier for use in thermoprinting textiles by transfer of vapors of at least one dyestuff vaporizing at atmospheric pressure at a temperature of above 160° C which carrier comprises a sheet or strip material containing on a face thereof a print, said print containing at least one dyestuff which, at atmospheric pressure, passes into the vapor state at a temperature above 160° C, the improvement wherein the sheet or strip material is vegetable parchment and the print contains at least one cationic dyestuff and an alkalizing agent in a single printed layer.

4,076,496

COLORING METHOD FOR SYNTHETIC RESIN

Tadashi Hamano, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Jul. 15, 1975, Ser. No. 595,900
Claims priority, application Japan, Jul. 17, 1974, 49-81153
Int. Cl.² D06P *3/00*
U.S. Cl. 8—4 9 Claims

1. A coloring method for the surfaces of synthetic resin articles comprising, the step of heating an aqueous dye solution to a temperature less than the softening temperature of said resin; and applying the heated aqueous solution to the article to be colored; wherein said aqueous solution consisting, essentially of 0.1–50 weight percent of at least one polyacid having the chemical formula $HO_2C(CH_2)_nCO_2H$ wherein n is integer of at least 4 and sufficient to inhibit esterification of said polyacid with polyhydric alcohol; 5–60 weight percent of at least one polyhydric alcohol and an effective quantity of a resin-substantive dye in water.

4,076,497

CONTINUOUS DYEING OF POLYESTER FIBERS AND CELLULOSE FIBERS

Peter Freyberg, Speyer; Dieter Horn, Heidelberg; Knut Oppenlaender; Hans Wolf, both of Ludwigshafen, and Dieter Distler, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jan. 22, 1976, Ser. No. 651,431
Claims priority, application Germany, Feb. 1, 1975, 2504282
Int. Cl.² D06P *3/82;* C09B *67/00*
U.S. Cl. 8—21 C 7 Claims

1. A process for the continuous dyeing of polyester fibers, cellulose fibers or blends of these fibers, which process comprises:

continuously applying to said fibers an aqueous dye liquor which contains

I. a disperse dye for polyester fibers, and for cellulose fibers a dye selected from the group consisting of vat dyes, naphthol dyes, sulfur dyes and direct dyes, and

II. from 0.5 to 70 g/l of said aqueous dye liquor of an antimigration agent selected from the group consisting of polyoxyalkylated amines, amine oxides of polyoxyalkylated amines and quaternized polyoxyalkylated amines which in 1% strength aqueous solution have a cloud point of at least 18° C and which are each derived from amines which contain at least 2 nitrogen atoms and at least one group which can be oxyalkylated and in which the polyoxyalkylene chain contains

a. ethylene oxide units and

b. a second component selected from the group consisting of propylene oxide, butylene oxide, cyclohexene oxide and styrene oxide units in the molar ratio a:b of from 10:1 to 0.1:1,

said continuous application being carried out at a temperature below that at which the dye or dyes flocculate from the liquor;

drying the fibers while heating at an elevated temperature sufficient to flocculate the dye or dyes from the liquor; and

fixing the dye or dyes to said fibers.

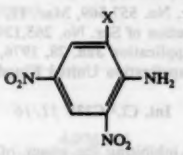
4,076,498

DYED POLYETHYLENE TEREPHTHALATE TEXTILE FIBERS WITH GREENISH BLUE SHADE

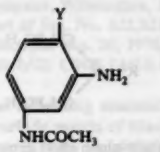
Laszlo A. Meszaros, Charlotte, N.C., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Sep. 20, 1976, Ser. No. 724,850
Int. Cl.² C09B *27/00;* D06P *1/02*
U.S. Cl. 8—41 C 5 Claims

1. Polyethylene terephthalate textile fibers dyed with the dyestuff resulting from coupling equimolar amounts of diazotized



and the coupling components obtained by reacting



with diethyl sulfate, wherein X is Cl or Br, and Y is methoxy or ethoxy.

4,076,499

METHOD FOR WASHING CONTINUOUSLY MOVING YARN

Evsei Moiseevich Mogilevsky, Kutuzovsky prospekt, 17, kv. 9, Moscow, U.S.S.R.

Filed Jun. 3, 1975, Ser. No. 583,413
Int. Cl.[2] D01F *11/00*
U.S. Cl. 8—137.5 7 Claims

1. A method for washing continuously moving freshly formed rayon yarn, which comprises effecting, subsequent to formation and afterregeneration, preliminary washing of the freshly formed continuously moving rayon yarn by way of dipping said continuously moving yarn into and removing it from a bath filled with water having a pH of from 1.5 to 2.5, and subjecting said thus prewashed continuously moving yarn to a final wash consisting of sprinkling the continuously moving yarn with warm water having a pH of from 7.0 to 7.5 and a temperature of 50° to 75° C, thereby effecting the final washing of said yarn; said water used in said preliminary washing having a temperature of at least 30° C, but lower than that of the sprinkling water.

4,076,500

TREATMENT OF TEXTILE MATERIALS

William A. Rearick, Charlotte, N.C., assignor to ICI Americas Inc., Wilmington, Del.

Filed Jun. 18, 1976, Ser. No. 697,590
Int. Cl.[2] D06L *1/02*
U.S. Cl. 8—139.1 10 Claims

1. A multi-stage process for the scouring and bleaching of textile material containing cotton which comprises contacting said textile material with an emulsion comprising (a) from about 0.1 to about 10% by weight of an aqueous solution containing from about 99.5% to about 40 parts of water and from about 0.5 to about 60 parts of an alkaline compound, (b) emulsified in from about 90 to about 99.9% by weight of a chlorinated hydrocarbon, and (c) from about 0.001 to about 5% by weight of an emulsifier; contacting the textile materials with steam to remove the chlorinated hydrocarbon; padding the textile materials in an aqueous solution of a peroxygen compound wherein the temperature of said solution is from about 25° C. to about 60° C.; subjecting the textile materials to the action of steam; and washing the textile materials with water.

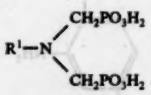
4,076,501

CORROSION INHIBITION OF WATER SYSTEMS WITH PHOSPHONIC ACIDS

Arthur Harris, Poynton; John Burrows, Congleton, and James Roger Hargreaves, Sale, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 557,569, Mar. 11, 1975, abandoned, which is a continuation of Ser. No. 265,139, Jun. 22, 1972, abandoned. This application Jan. 28, 1976, Ser. No. 653,805
Claims priority, application United Kingdom, Jun. 26, 1971, 30063/71
Int. Cl.[2] C23F *11/16*
U.S. Cl. 21—2.7 A 7 Claims

1. A process for inhibiting the attack of a corrosive water system on metals with which it comes into contact which comprises incorporating in the system a phosphonic acid of the general formula:



in which R^1 is a straight-chain alkyl group containing from 1 to 5 carbon atoms, an alkenyl group containing from 3 to 5 carbon atoms in which the double bond is not adjacent to the nitrogen, a tolyl group, a benzyl group or a cyclohexyl group.

4,076,502

METHOD, COMPOSITION, AND DEVICE FOR DETERMINING THE SPECIFIC GRAVITY OF A LIQUID

James B. Dugle, and C. Bradley Hager, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 549,944, Feb. 14, 1975, abandoned. This application Jun. 14, 1976, Ser. No. 696,050
Int. Cl.[2] G01N *31/14, 31/22, 33/16*
U.S. Cl. 23—230 R 31 Claims

1. A method for determining the specific gravity of a urine sample, which method comprises the steps of:

(a) contacting said sample with a predetermined concentration of an enzyme and of a reagent upon which said enzyme exerts its catalytic activity, the rate of reaction of said reagent in the presence of said enzyme being affected by the aggregate solute content of said sample,

(b) determining the rate of said reaction in contact with said sample, and

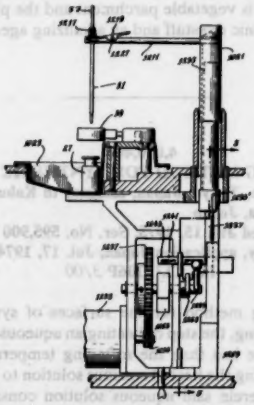
(c) comparing such determined reaction rate to the rates of said reaction when carried out in contact respectively with samples of urine having known different specific gravities.

4,076,503

PIPETTING SYSTEM FOR USE IN KINETIC ANALYSIS APPARATUS AND THE LIKE

John G. Atwood; Charles F. DeMey, III, both of Redding; Hamilton W. Marshall, Jr., Ridgefield, and Lucien C. Ducret, Riverside, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 499,792, Aug. 22, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 640,459
Int. Cl.[2] G01N *1/10*
U.S. Cl. 23—259 4 Claims



1. Apparatus for transferring a liquid reagent from a reagent container to a reaction vessel comprising:

(a) a pipette having a storage volume at least equal the volume to be taken from said reagent container;

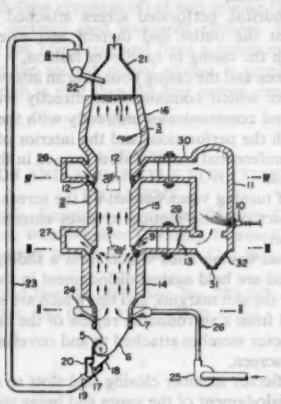
(b) pump means including a piston and a cylinder;

(c) a flexible conduit filled with air coupling said pipette to said pump means;
(d) means for positioning said pipette vertically and rotationally in a horizontal plane to locate said pipette above said reagent container or in either said reagent container or said reaction vessel;
(e) means for absorbing liquid disposed over said reagent container in the path of travel of the pipette to and from said reagent container said aborbing means being an irrigated sponge which is penetrable by said pipette in both directions travelled thereby to wipe the outer portions thereof; and
(f) means for controlling said pump means to cause said pipette to draw in reagent in excess of the required reagent volume to be deposited in the reaction vessel, to cause said pipette to discharge only the required amount of reagent into said reaction vessel, and then to cause said pipette to expel the excess volume onto said absorbing means when located above said reagent container.

4,076,504
WASTE GAS PURIFICATION APPARATUS

Naoichi Oshida, Yokohama, and Eiichi Ando, Kanagawa, both of Japan, assignors to Kabushiki Kaisha Sato Gijutsu Kenkyusho, Fujisawa and Shinagawa Furnace Co., Ltd., Tokyo, both of, Japan

Filed Jul. 29, 1976, Ser. No. 709,649
Claims priority, application Japan, Aug. 14, 1975, 50-98113
Int. Cl.² F23G *7/06*
U.S. Cl. 23—277 C **1 Claim**



1. A waste gas purification apparatus comprising in combination:
(a) an elongated vertical hollow furnace shaft (2), with upper and lower ends and waste gas inlet means (7) at the lower end, said shaft being adapted to receive therein pebbles or pellets;
(b) a plurality of in series discharge hoppers (6, 18, 20) with a pebble discharge means (5, 17, 19) at said lower end;
(c) an exhaust gas duct (21) at the top of said shaft (2) said duct (21) having a lower part, a pebble feeding chute (22) coupled to said lower part, with a pebble charge device (8) and a pebble recirculating tube (23) extending from said discharge hoppers to said charge device (8);
(d) an annular waste gas supply main (24) around said lower end connected to said gas inlet means (7), blower means (25) coupled to said gas inlet means (7) for force feeding waste gas through said gas inlet means;
(e) an inactive travel zone (33) defined at said upper end having a widening section with a narrow outlet, a lower shaft (14) towards the lower end with a uniform cross-section; and,
(f) an intermediate shaft (15) between said inactive travel zone (33) and said lower shaft (14), including a temperature control chamber (11) in parallel with said intermediate shaft, branch lines (27, 28) connecting said intermediate shaft and said temperature control chamber, including damper means (13) to control the flow of gas, a dust pocket (32) in said temperature control chamber, whereby pebbles or pellets move downwards in the shaft from the inactive travel zone (33) to the discharge hoppers and are recirculated to the upper end while waste gas is fed to the lower end and travels up through the shaft, a portion of the gas passing through the temperature control chamber, the clean gas leaving the upper end.

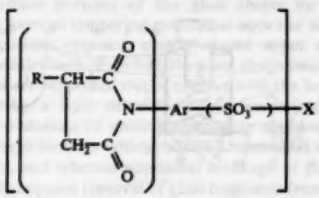
4,076,505
COAL DESULFURIZATION PROCESS

Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 22, 1976, Ser. No. 743,739
Int. Cl.² C10L *9/10, 9/00*; C10B *57/00*
U.S. Cl. 44—1 R **6 Claims**

1. In a process for reducing the pyritic sulfur and ash content of coal under sink-float separation conditions, the improvement which comprises (1) contacting finely comminuted coal with a heavy organic liquid medium having a specific gravity of at least 1.1, and having dissolved therein a dispersant quantity of ionic surfactant which is a hydrocarbyl-succinimide derivative of an aminoarylsulfonic acid salt; and (2) separating the coal float phase from the heavy organic liquid medium, and recovering coal with a reduced sulfur and ash content.

5. A process in accordance with claim 1 wherein the ionic surfactant is a salt containing the following structural elements:



wherein R is an acyclic hyrocarbyl group containing between about 5 and 1000 carbon atoms; Ar is a polyvalent aromatic radical; X is a metal or HNR'_3 cation; and R' is hyrogen or a hydrocarbyl substituent.

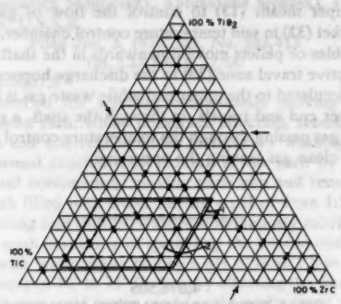
4,076,506
TRANSITION METAL CARBIDE AND BORIDE ABRASIVE PARTICLES

Herbert Valdsaar, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 621,821, Oct. 14, 1975, abandoned. This application Sep. 30, 1976, Ser. No. 728,414
Int. Cl.² B24D *3/02*; C04B *31/16*; C09C *1/68*
U.S. Cl. 51—307 **14 Claims**

1. Abrasive particles consisting essentially of from 69% to 94% by weight of a carbide matrix of titanium and zirconium carbide, and from 6% to 31% by weight of crystalline titanium diboride grains dispersed throughout said carbide matrix, said carbide matrix being at least partially in the form of one or more solid solutions of zirconium carbide and titanium carbide

with proviso that said zirconium carbide is present in an amount of from 10% to 46% by weight, based on the total



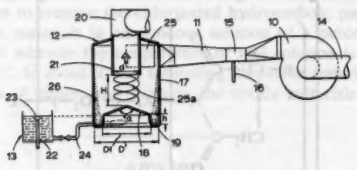
weight of the titanium and zirconium carbides and borides present.

4,076,507

CENTRIFUGAL SEPARATOR FOR SEPARATING LIQUID AND GAS

Georg Hans Henrik Hauberg, Allerod, Denmark, assignor to Aktieselskabet Niro Atomizer, Soborg, Denmark

Filed Jun. 17, 1976, Ser. No. 696,917
Claims priority, application Denmark, Jun. 18, 1975, 2757/75
Int. Cl.² B01D *45/12*
U.S. Cl. 55—1 **12 Claims**



1. A centrifugal separator for separating liquid from a gas and comprising

a. a container having a circumferential cylindrical wall shaped substantially as a surface of revolution with a substantially vertical axis and a bottom wall defining a central inner surface part having an upwardly domed shape spaced from the side wall, an annular channel being defined between said central surface part of the bottom wall and the lower part of the circumferential wall of the container

b. means for introducing a mixture of gas and liquid into the container and for causing said mixture to rotate about said vertical axis,

c. a gas discharge tube extending centrally into the upper end of the container and having an unobstructed end opening terminating at a position spaced substantially from said central surface part of the container bottom, and

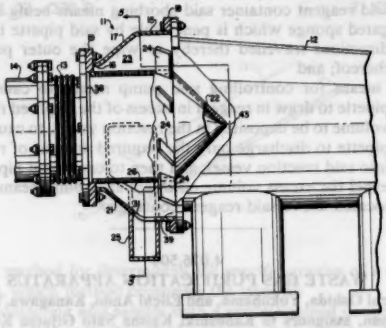
d. outlet means communicating with said channel for discharging liquid from the container and level control means for securing a predetermined minimum liquid level in the channel of the container at least above the liquid discharge outlet means and a maximum liquid level in the channel whereby the upper surface portion of said domed central inner surface is only wetted by a thin liquid film.

4,076,508

DEBRIS SEPARATOR FOR HOT GAS STREAM

Frederich M. Christensen, 10256 Prarie Road, Omaha, Nebr. 68134

Filed May 31, 1977, Ser. No. 801,779
Int. Cl.² B01D *50/00*
U.S. Cl. 55—309 **11 Claims**



1. A separator for removing entrained debris from hot gases flowing from the exhaust manifold of an engine to the inlet of an associated turbocharger, the separator comprising

a. a tubular casing having inlet and outlet openings at its opposite ends;

b. a cylindrical, perforated screen attached to the casing adjacent the outlet end thereof and extending axially through the casing in cantilever fashion,

c. the screen and the casing bounding an intervening annular chamber which communicates directly with the casing inlet, and communicates indirectly with the casing outlet through the perforations and the interior of the screen;

d. a circumferential series of slots formed in the screen at its free end;

e. a set of turning vanes carried by the screen and arranged to impart swirling motion to gases entering the annular chamber,

f. the vanes having hubs which form a sliding fit with said slots and are held against dislodgment in the radial direction by the slot margins, and tips which are spaced radially inward from a surrounding region of the casing;

g. a deflector member attached to and covering the free end of the screen,

h. the deflector member closing said slots so as to preclude axial dislodgment of the vanes and being shaped to direct approaching hot gases radially outward to the annular chamber; and

i. a collection duct which communicates with an outer peripheral region of the annular chamber and serves to withdraw from that chamber debris which separates from the hot gases.

4,076,509

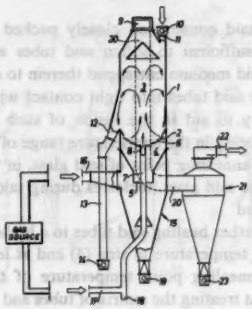
APPARATUS FOR PROCESSING DUST-CARRYING GAS AND BULK GOODS

Bo Christer Ferm, Enkoping, Sweden, assignor to AB Bahco Ventilation, Enkoping, Sweden

Filed May 20, 1976, Ser. No. 688,151
Claims priority, application Sweden, Jun. 2, 1975, 75062828
Int. Cl.² B01D *50/00*
U.S. Cl. 55—320 **5 Claims**

1. An apparatus adapted for intermingling dust-carrying gas and bulk goods for treating either one of them, e.g. drying the bulk goods or scrubbing the gas, in a bed of the bulk goods aerated by the gas and comprising a grating (2) with through-flow openings (6) for a first partial stream of the gas, an aerating bed operatively associated with said grating, said openings

being so directed that this first partial stream flows substantially horizontally from the outside and inwardly towards the middle of said bed, a further gas inlet (8) in substantially the center of the grating (2), a communicating duct (7) leading to said inlet (8) for introducing a second partial stream of the gas from below and upwardly in said bed, and a cyclone dust separator (15) having an output defined by a truncated element connected to the wall of said cyclone separator and in commu-



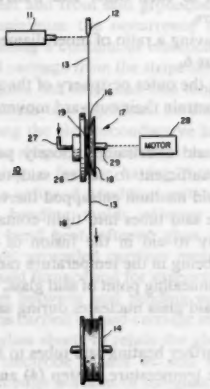
nication with said grating openings (6) and an input in communication with a gas supply source providing said first partial stream for cleaning the first partial stream before it is supplied to said through-flow openings (6) of said grating (2), said duct (7) extending through said truncated element, both partial streams of the gas being received from a common gas supply source so that the second partial stream is supplied to said grating more rich in dust than the first partial stream.

4,076,510

METHODS AND APPARATUS FOR COATING A FILAMENT

Jaroslav Mracek, Lawrence Township, Mercer County, and Un-Chul Paek, West Windsor Township, Mercer County, both of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Dec. 23, 1976, Ser. No. 753,767
Int. Cl.² C03C *25/02*; C03B *37/02*
U.S. Cl. 65—3 A **13 Claims**



4. An apparatus for uniformly and concentrically coating a continuous filament, of substantially circular cross-section, with a viscous fluid material, comprising:

means for forming a substantially planar rotating body of the material;

means for forming a vortex of the material in tandem relationship with the rotating body of material; and

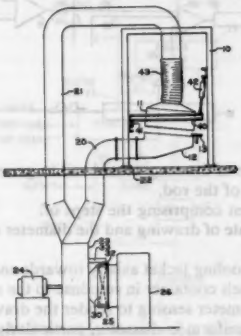
means for moving the filament through the rotating material in the plane of the rotating body of material and through the central portion of the vortex to uniformly and concentrically coat the filament.

4,076,511

METHOD OF OPERATING A GLASS SHEET TEMPERING LINE

Robert C. Fulton, Monroeville; Donald L. Edmunds, Bethel Park, and George B. Shields, Lower Burrell, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 13, 1977, Ser. No. 759,151
Int. Cl.² C03B *27/00*
U.S. Cl. 65—27 **9 Claims**



1. In the method of tempering glass sheets by heating glass sheets to a temperature suitable for tempering and then rapidly cooling surface portions of the glass sheets by directing streams by gaseous tempering medium at opposite sides of the glass sheets from opposed, closely spaced upper and lower arrays of nozzles between which the glass sheets pass while the glass sheets are supported out of contact with the lower array of nozzles by a layer of said gaseous tempering medium, wherein the streams of gaseous tempering medium are propelled by large blowers which require a substantial amount of time to halt, and wherein accidental breakage of glass sheets occasionally requires removal of glass fragments from between said arrays of nozzles, the improvement comprising upon the occurrence of glass breakage, substantially simultaneously damping the flow of tempering medium to at least one lower nozzle array section to a sufficient degree to avoid blowing glass fragments out of said lower nozzle array section without significantly reducing blower speed, and increasing the separation between said lower nozzle array section and its corresponding upper nozzle array section so as to render glass fragments more accessible for removal.

4,076,512

CONTROLLED METHOD FOR THE PRODUCTION OF CLAD GLASS ROD

James Robert Mellor, Ormskirk, and Colin Billington, Burscough, both of England, assignors to Pilkington Brothers Limited, St. Helens, England

Filed Sep. 9, 1976, Ser. No. 721,924
Claims priority, application United Kingdom, Sep. 15, 1975, 37831/75
Int. Cl.² C03B *15/16*
U.S. Cl. 65—29 **8 Claims**

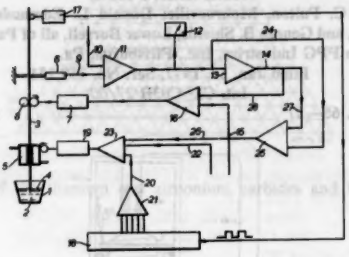
1. In a method of producing clad glass rod of substantially uniform diameter including the steps of:

supporting within the same container a glass melt of a molten layer of a first glass on a molten layer of a second glass,

said two layers being provided by two quiescent pools of glass, one overlying the other within said same container,

drawing from the free surface of the upper layer a clad glass rod comprising an outer cladding of said first glass on a core of said second glass which is entrained at the interface between said layers,

stabilizing said drawn clad glass rod by cooling said drawn glass layer by a cooling jacket which surrounds said drawn glass so as to cool said drawn glass into solid form above the surface of said upper layer, and



varying the rate of drawing of said rod to generally control the diameter of the rod,

the improvement comprising the steps of:

sensing the rate of drawing and the diameter of the drawn rod, and

moving the cooling jacket axially towards and away from the glass melt container in response to the rate of drawing and diameter sensing to render the drawn clad glass rod more uniform in diameter, particularly as the level of glass melt within the container varies.

4,076,513

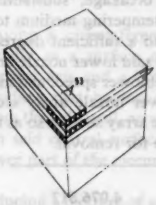
METHOD FOR MAKING TRANSVERSE TUBE RECUPERATOR

Yu K. Pei, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 650,995, Jan. 21, 1976, which is a continuation of Ser. No. 146,665, May 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 30,859, Apr. 22, 1970, abandoned. This application Mar. 29, 1977, Ser. No. 782,608

Int. Cl.[2] C03B *32/00*

U.S. Cl. 65—33 9 Claims



1. A method for making a lightweight, foraminous matrix comprising an assembly of integrally fused tubes forming a first and a second series of longitudinal parallel passageways therethrough, wherein the walls defining said passageways have essentially zero porosity and an average coefficient of lineal thermal expansion of about -12 to $+12 \times 10^{-7}/°$ C. over the range 0°–300° C., which comprises

(1) arranging a plurality of layers of tubes made of a glass that is thermally crystallizable to a low expansion glass-ceramic having a coefficient of lineal thermal expansion of about -12 to $+12 \times 10^{-7}/°$ C. over the range before stated, each of the tubes being sealed at each end and containing an expansible fluid medium, the layers of tubes being superimposed one above the other in successive parallel planes, the tubes within each plane being essentially parallel to each other and transverse to tubes in adjacent layers,

(2) said tubes having a ratio of inner diameter to wall thickness of at least 6,

(3) constraining the outer periphery of the assembly of tubes to closely constrain their outward movement in any direction,

(4) subjecting said constrained closely packed tubes to a temperature sufficient to soften said tubes and thus to cause said fluid medium entrapped therein to expand and thus urge the said tubes into tight contact with adjacent tubes, thereby to aid in the fusion of such tubes, said temperature being in the temperature range of 50° to 250° F. above the annealing point of said glass, in which temperature range said glass nucleates during said expansion and fusion, and

(5) thereafter further heating said tubes to a higher temperature than the temperature in step (4) and at least 200° F. above the annealing point temperature of the original glass, and heat treating the matrix of tubes and thus effecting further expansion and crystallization, and continuing such heating until a sealed glass-ceramic matrix having a linear expansion coefficient in the range of from -12 to $+12 \times 10^{-7}/°$ C. over the range 0°–300° C. is obtained.

7. A method for making a recuperator comprising a lightweight, foraminous matrix comprising an assembly of integrally fused tubes forming a first and a second series of longitudinal parallel passageways therethrough, wherein the walls defining said passageways have essentially zero porosity and an average coefficient of lineal thermal expansion of about -12 to $+12 \times 10^{-7}/°$ C over the range of 0°–300° C, which comprises

(1) arranging a plurality of layers of tubes made of a glass thatis thermally crystallizable to a low expansion glass-ceramic having a coefficient of lineal thermal expansion of about -12 to $+12 \times 10^{-7}/°$ C over the range before stated, each of the tubes being sealed at each end and containing an expansible fluid medium, the layers of tubes being superimposed one above the other in successive parallel planes, the tubes within each plane being essentially parallel to each other and transverse to tubes in adjacent layers,

(2) said tubes having a ratio of inner diameter to wall thickness of at least 6,

(3) constraining the outer periphery of the assembly of tubes to closely constrain their outward movement in any direction,

(4) subjecting said constrained closely packed tubes to a temperature sufficient to soften said tubes and thus to cause said fluid medium entrapped therein to expand and thus urge the said tubes into tight contact with adjacent tubes, thereby to aid in the fusion of such tubes, said temperature being in the temperature range of 50° to 250° F above the annealing point of said glass, in which temperature range said glass nucleates during said expansion and fusion, and

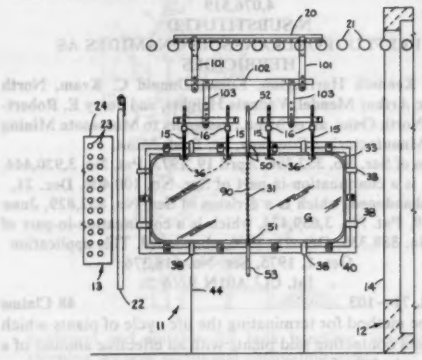
(5) thereafter further heating said tubes to a higher temperature than the temperature in step (4) and at least 200° F above the annealing point temperature of the original glass, and heat treating the matrix of tubes and thus effecting further expansion and crystallization, and continuing such heating until a sealed glass-ceramic matrix having a linear expansion coefficient in the range of from -12 to $+12 \times 10^{-7}/°$ C over the range 0°–300° C is obtained.

4,076,514

INSULATED TONGS FOR SUPPORTING GLASS SHEETS DURING PRESS BENDING TO V SHAPES AND PROCESS OF USE

Joseph B. Kelly, Crestline, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 3, 1977, Ser. No. 756,211
Int. Cl.² C03B 23/02
U.S. Cl. 65—106 6 Claims



1. In a method of shaping a glass sheet to a sharp radius of bending by heating said glass sheet to a temperature at which glass is electroconductive and press bending said sheet in conjunction with applying electric current along a stripe of electroconductive material applied to said sheet along a line of sharp bending while supporting said glass sheet by glass engaging elements of metal tongs of electroconductive material supported by and connected to a grounded tong supporting carriage of electroconductive material,

the improvement comprising insulating the glass engaging elements of the tongs from the grounded tong supporting carriage, thereby avoiding uncontrolled current flow from said stripe through said electroconductive glass, said tongs and said carriage to ground by providing electrical insulator means between said tongs and the grounded tong supporting carriage of sufficient length to effectively insulate the metal tongs from the grounded tong supporting carriage and located a sufficient distance from both said glass sheet and from said grounded tong supporting carriage to minimize the occurrence of arcing and to avoid establishing a continuous electrical current flow to the grounded carriage from the stripe through the electroconductive glass, the tongs and said tong supporting carriage that reduces to a significant extent the electric current flow along the electroconductive heating stripe.

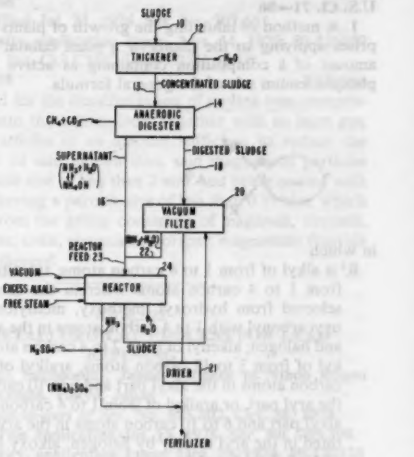
4. Apparatus for shaping a glass sheet to a sharp radius of bending, comprising: a furnace having means for heating a sheet of glass to a softened condition suitable for bending, a pair of opposed bending molds adjacent to said furnace adapted to press bend heat-softened glass sheets suspended between the molds, grounded carriage means for conveying glass sheets from said furnace and for supporting glass sheets in a bending location between said bending molds, electroconductive tong means carried by said carriage means for gripping edge portions of glass sheets to retain the glass sheets on said carriage means, electrode means at said bending location adapted to contact edge portions of the glass sheets for applying electrical current across the glass sheets along a line of sharp radius bending, a block of insulator material disposed between each tong means and the respective carriage means by which it is carried so as to electrically insulate said tong means from said carriage means, whereby electrical arcing from said electrode means to said tong means is substantially avoided.

4,076,515

METHOD FOR TREATMENT OF DIGESTER SUPERNATANT AND OTHER STREAMS IN WASTEWATER TREATMENT FACILITIES

M. David Rickard, 3530 Silver Springs Road, Lafayette, Calif. 94549

Filed Jul. 9, 1975, Ser. No. 594,541
Int. Cl.² C02C 1/14, 5/10, 3/00; C05F 7/00
U.S. Cl. 71—10 2 Claims



1. A method of treating waste water in a sewage treatment plant to remove ammonia comprising the sequential steps of:

A. reducing said waste water to sludge;

B. placing said sludge in an anaerobic digester;

(1) converting a substantial quantity of the putrescible organic material found in said sludge to methane and carbon dioxide, and,

(2) converting a substantial quantity of nitrogen found in said sludge to ammonia;

C. removing the digester supernatant;

D. dewatering said digested sludge to separate from the sludge, dewatering liquor being substantially composed of water and water soluble ammonia;

E. combining said supernatant with said dewatering liquor;

F. reacting with said supernatant and dewatering liquor, to form a reaction product, a stoichiometric excess of lime thus converting ammonia salts found in the supernatant and dewatering liquor to free or aqueous ammonia;

G. rendering the ammonia less soluble in the reaction product by applying to said product, live steam under reduced pressure.

4,076,516

AQUATIC HERBICIDES

Joseph F. Vartiak, Naperville, Ill., and George E. Wortley, Longwood, Fla., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 740,509, Nov. 10, 1976, abandoned. This application May 19, 1977, Ser. No. 798,411
Int. Cl.² A01N 17/00
U.S. Cl. 71—66 12 Claims

1. A process for improving the activity of aquatic herbicides which comprises applying these herbicides under water to the vegetation to be controlled in the presence of a minor amount of a water soluble acrylic acid polymer which has a molecular weight of at least 10,000.

4,076,517
METHOD OF INHIBITING THE GROWTH OF PLANTS WITH PHOSPHOLENIUM SALTS

Klaus Naumann, Cologne; Klaus Sasse, Gladbach-Schildgen, and Klaus Lurssen, Berg.-Gladbach, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 15, 1976, Ser. No. 649,439
Claims priority, application Germany, Jan. 27, 1975, 2503210
Int. Cl.² A01N 9/36
U.S. Cl. 71—86 5 Claims

1. A method of inhibiting the growth of plants which comprises applying to the plants or a plant habitat an effective amount of a composition containing as active ingredient a phospholenium salt of the general formula

(I),

in which

R^1 is alkyl of from 1 to 4 carbon atoms; substituted alkyl of from 1 to 4 carbon atoms wherein the substituents are selected from hydroxyl, methoxy, methylcarbonyl, alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy group and halogen; alkenyl of from 2 to 4 carbon atoms, cycloalkyl of from 3 to 12 carbon atoms, aralkyl of from 1 to 4 carbon atoms in the alkyl part and 6 to 10 carbon atoms in the aryl part, or aralkyl of from 1 to 4 carbon atoms in the alkyl part and 6 to 10 carbon atoms in the aryl part substituted in the aryl moiety by halogen; alkoxy and alkylthio of from 1 to 4 carbon atoms;

R^2 is alkyl of from 1 to 4 carbon atoms, substituted alkyl of from 1 to 4 carbon atoms wherein the substituents are selected from hydroxyl, methoxy, methylcarbonyl, alkoxycarbonyl with 1 to 4 carbon atoms in the alkoxy group, and halogen, alkenyl of from 2 to 4 carbon atoms, alkynyl of from 2 to 4 carbon atoms, cycloalkyl of from 3 to 12 carbon atoms, or aralkyl of from 1 to 4 carbon atoms in the alkyl part and 6 to 10 carbon atoms in the aryl part;

Y is a chain of the structure

$$-CH_2\text{-}CH{=}CH\text{-}CH_2- \text{ or } -CH{=}CH\text{-}CH_2\text{-}CH_2-$$

which can be monosubstituted or disubstituted by chlorine, bromine or alkyl of up to 4 carbon atoms, and

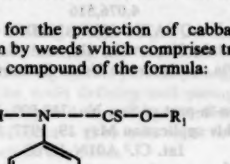
A^- is one equivalent of an anion of a non-phytotoxic acid.

4,076,518
SUBSTITUTED PHENYL THIOCARBAMATES WITH HERBICIDAL ACTION AND METHOD FOR THEIR PRODUCTION

Gerhard Boroschewski, Berlin, and Friedrich Arndt, Aich, both of Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany

Division of Ser. No. 171,757, Aug. 13, 1971, abandoned. This application Apr. 2, 1976, Ser. No. 672,940
Claims priority, application Germany, Aug. 20, 1970, 2042110
Int. Cl.² A01N 9/12; C07C 155/09
U.S. Cl. 71—100 10 Claims

1. A method for the protection of cabbage plantations against infestation by weeds which comprises treatment of the plantation with a compound of the formula:



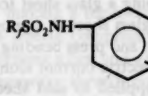
In which R_1 is methyl or ethyl, R_2 is hydrogen, methyl, or ethyl, R_3 is an alkyl radical having from 1 to 8 carbon atoms or a radical selected from the group consisting of allyl, cyclohexyl, napthyl, and phenyl radicals said compound being employed in an amount sufficient to control growth of weeds without causing significant damage to cabbage plants.

4,076,519
N-SUBSTITUTED PERFLUOROALKANESULFONAMIDES AS HERBICIDES

Joseph Kenneth Harrington, Edina; Donald C. Kvam, North Oaks; Arthur Mendel, Vadnais Heights, and Jerry E. Robertson, North Oaks, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 352,596, April 19, 1973, Pat. No. 3,920,444, which is a continuation-in-part of Ser. No. 100,404, Dec. 21, 1970, abandoned, which is a division of Ser. No. 832,829, June 12, 1969, Pat. No. 3,639,474, which is a continuation-in-part of Ser. No. 588,338, Oct. 21, 1966, abandoned. This application Oct. 1, 1975, Ser. No. 618,376
Int. Cl.² A01N 9/16
U.S. Cl. 71—103 48 Claims

1. The method for terminating the life cycle of plants which comprises contacting said plants with an effective amount of a compound of the formula:



or a metal, ammonium, alkyl amine or dialkanol amine salt thereof wherein R_f is a perfluoroalkyl group containing one to four carbon atoms, each Y is a non-cyclic group selected from alkyl, alkanoylamido, halo, haloalkyl, nitro, alkoxy, alkylsulfonyl, alkylsulfinyl, alkylthio, amino, sulfamoyl, carbamyl, alkoxyalkylthio and sulfamoylamino and *m* is 1–3, provided that all of the Y groups together contain not more than about twenty carbon atoms, at least one of the Y groups contains a heteroatom selected from oxygen, sulfur, nitrogen and halogen, no single Y contains more than six carbon atoms and at least one Y is other than alkyl, halo and haloalkyl.

4,076,520
METHOD FOR CONTINUOUS PASSIVATION OF SPONGE IRON MATERIAL

Wolfgang B. Pietsch, Matthews, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Division of Ser. No. 584,184, June 5, 1975, abandoned. This application Apr. 5, 1976, Ser. No. 673,788
Int. Cl.² C22B 1/14
U.S. Cl. 75—5 16 Claims

1. A method for forming a plurality of small, passivated, compact products from hot reactive particulate sponge iron comprising:

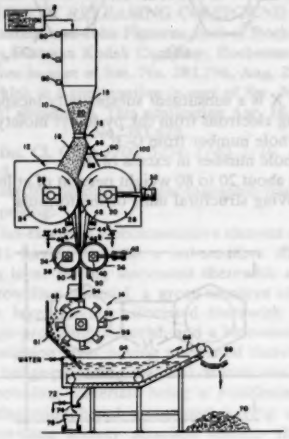
a. feeding said particulate sponge iron at a temperature of at least 600° C to a compacting apparatus;

b. compacting said particulate sponge iron to form a continuous densified elongated metal strip,

c. longitudinally cutting said densified elongated strip into a multiplicity of longitudinal strips; and

d. further dividing said multiplicity of longitudinal strips at regular intervals by shearing them transversely to their longitudinal dimension and simultaneously densifying the newly created surfaces normal to the longitudinal dimension, thus producing a plurality of small compacted

sponge iron products, each having a dense skin on all faces, whereby the products are resistant to atmospheric



oxidation and suitable for bulk handling, storing, and shipping without additional passivating steps.

4,076,521

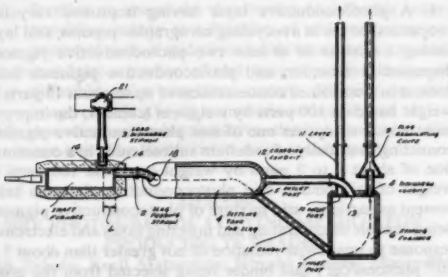
METHOD FOR CONTINUOUSLY BLOWING MATERIALS INTO MOLTEN SLAGS

Jordan Todorov Jordanov; Georgi Ivanov Abrashev; Velyu Dimitrov Jekov; Georgi Taney Georgiev; Georgi Alexandrov Haralampiev; Janco Hristov Janev, and Velcho Angelov Prodanov, all of Plovdiv, Bulgaria, assignors to Kombinat Za Zventi Metali "Dimiter Blagoev", Plovdiv, Bulgaria

Continuation of Ser. No. 72,484, Sep. 15, 1970, abandoned, which is a continuation-in-part of Ser. No. 620,018, Mar. 2, 1967, abandoned. This application Dec. 1, 1975, Ser. No. 636,434

Int. Cl.[2] C21B *3/04;* C22B *13/00*

U.S. Cl. 75—24 5 Claims



1. A method for the recovery of non-ferrous metals, comprising the steps of continually introducing an oxygen-containing gas under superatmospheric pressure into a shaft furnace containing a carbonaceous fuel and a mixture of agglomerates of non-ferrous metal concentrates to form a layer of molten metal and a superposed layer of molten slag at the bottom of the shaft furnace, separately tapping the metal layer and the slag from the bottom of the shaft furnace, flowing the tapped slag from the shaft furnace directly into a separate settling tank whereby a mixture of recoverable metal particles and the slag settles and defines a layer below the slag in the settling tank, locally heating the slag in the settling tank above the level of the settled metal particle layer but below the surface of the slag, continually discharging the heated slag from the settling tank to a first location of a separate slag-containing fuming furnace at a level substantially above the level of the slag already present in the fuming furnace, agitating the resulting slag mixture in the fuming furnace, and continuously tapping the slag mixture from the fuming furnace.

4,076,522

METHOD FOR THE DESULFURIZATION OF MOLTEN IRON

Hiroshi Yoshida, Kasukabe, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1976, Ser. No. 707,651

Claims priority, application Japan, Nov. 14, 1975, 50-136199

Int. Cl.[2] C21C *7/02;* C22C *33/08*

U.S. Cl. 75—58 3 Claims

1. A method for the desulfurization of molten iron comprising blowing into the molten iron, together with an inert gas, magnesium particles in an amount sufficient to reduce the sulfur content of said molten iron, said magnesium particles having a particle size of less than 2 mm. and being coated with fine particles having a particle size of less than 0.15 mm. which are selected from the group consisting of magnesia, zirconia, titania, graphite, coke, charcoal, fluorspar, magnesium fluoride and mixtures thereof.

4,076,523

PYROMETALLURGICAL PROCESS FOR LEAD REFINING

Toshihiro Yuki, Saganoseki, Japan, assignor to Nihon Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 625,802, Oct. 28, 1975, abandoned. This application Jul. 15, 1976, Ser. No. 705,390

Claims priority, application Japan, Oct. 28, 1974, 49-123323

Int. Cl.[2] C22B *13/00*

U.S. Cl. 75—77 9 Claims

1. In a pyrometallurgical lead refining process comprising the steps of sintering raw materials including lead concentrate to produce lead oxide and reducing said lead oxide to metallic lead, the improvement comprising mixing zinc removed tailings obtained in a zinc refining process with said raw materials and said lead concentrate before said sintering step.

4,076,524

REDUCTION IN SWELLING OF IRON CAUSED BY IRRADIATION

Fred A. Smidt, Jr., Springfield, and James A. Sprague, Burke, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 15, 1973, Ser. No. 416,139

Int. Cl.[2] C22C *38/12*

U.S. Cl. 75—123 J 2 Claims

1. Ferrous nuclear reactor core components having substantial resistance to swelling caused by neutron irradiation consisting essentially of 99.7 at % of iron and 0.3 at % of a solute atom selected from the group consisting of vanadium and phosphorus.

4,076,525

HIGH STRENGTH FRACTURE RESISTANT WELDABLE STEELS

Clayton D. Little, Fort Worth, and Paul M. Machmeier, Benbrook, both of Tex., assignors to General Dynamics Corporation, Fort Worth, Tex.

Filed Jul. 29, 1976, Ser. No. 709,751

Int. Cl.[2] C22C *38/52*

U.S. Cl. 75—128 B 25 Claims

1. A weldable alloy steel having high strength and high fracture toughness consisting essentially of 0.12% – 0.17% carbon, 1.8% – 3.2% chromium, 0.9% – 1.35% molybdenum, 11.5% – 14.5% cobalt, and 9.5% – 10.5% nickel, all as percents by weight, the remainder being iron with minor amounts of impurities and residual elements, said steel having an ultimate tensile strength of from about 220 Ksi to about 270 Ksi, a

tensile yield strength of from about 210 Ksi to about 245 Ksi and a fracture toughness (K_{IC}) greater than about 115 Ksi $\sqrt{\text{inch}}$.

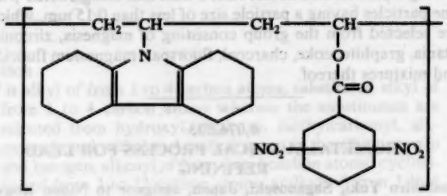
4,076,526

PHOTOCONDUCTIVE N-VINYL CARBAZOLE COPOLYMERS AND PROCESS FOR PREPARING SAME

James E. Mulvaney, Tucson, Ariz., and Raymond W. Rupp, Greenville, S.C., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Feb. 11, 1977, Ser. No. 768,008
Int. Cl.² G03G 5/04, 5/07
U.S. Cl. 96—1.5 R **4 Claims**

1. A photoconductive N-vinyl carbazole copolymer having electron donor and electron acceptor groups in the same polymer chain characterized by a repeat unit of the formula:



wherein x has a value of at least two.

4,076,527

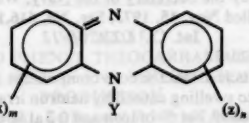
PHOTOSENSITIVE COMPOSITION USEFUL IN PHOTOELECTROPHORETIC IMAGING

Richard H. Nealy, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 26, 1976, Ser. No. 735,355
Int. Cl.² G03G 5/04, 16/00
U.S. Cl. 96—1 PE **8 Claims**

1. A photosensitive composition containing at least about 0.01 weight percent vanadyl phthalocyanine pigment dispersed in an insulating carrier liquid, and in at least partial association with said pigment

i. from about 0.01 to about 10 weight percent of a desensitizing dye of the formula



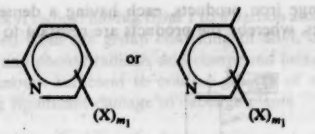
wherein X and Z are independently defined as members selected from the group consisting of —NH_2 and —NHR in which R is defined as a phenyl or phenylsulfonate substituent;

Y is defined as a phenyl group; and

m and n are individually defined as integers of 0–2, either m or n being defined as at least 1; and

ii. about 1 to about 5 weight percent or a mixture of polymeric materials containing from about 20 to about 80 weight percent of at least one polymer having repeating structural units of the formula

wherein Z is defined as a group of the formulae

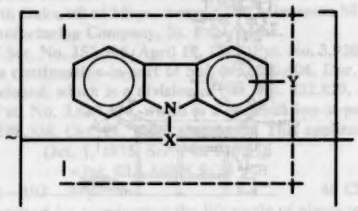


in which X is a substituent substantially incapable of withdrawing electrons from the pyridinyl moiety;

m_1 is a whole number from 0–3;

n_1 is a whole number in excess of 25;

and from about 20 to 80 weight percent of at least one polymer having structural units of the formula



wherein X is vinyl, alpha-alkyl-substituted vinyl, or alkyl of 1 to 4 carbon atoms; and

Y is vinyl, alpha alkyl-substituted vinyl or an alkyl of 1 to 4 carbon atoms, only one of either X or Y being defined as a vinyl or alpha alkyl-substituted vinyl group per structural unit.

4,076,528

XEROGRAPHIC BINDER PLATE

Lloyd F. Bean, Rochester, and Robert W. Gundlach, Victor, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 350,667, May 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 94,072, Dec. 1, 1970, abandoned. This application Apr. 14, 1975, Ser. No. 567,956
Int. Cl.² G03G 5/02, 5/06
U.S. Cl. 96—105 R **9 Claims**

1. A photoconductive layer having improved recycling properties for use in a recycling xerographic process, said layer having a mixture of at least two photoconductive pigments dispersed in a binder, said photoconductive pigments being present in a combined concentration of up to about 15 parts by weight based on 100 parts by weight of a binder, the improvement which comprises one of said photoconductive pigments consisting essentially of cadmium sulfoselenide in a concentration of about $\frac{1}{2}$ to 5 parts by weight based on 100 parts by weight of said binder, said photoconductive pigments being present as particles, said mixture of photoconductive pigments being capable of generating and injecting holes and electrons in response to imagewise radiation of not greater than about 5×10^{14} photons/cm², said binder being selected from the group consisting of a vinylchloride-vinylacetate copolymer sensitized with 2,5-bis(p-N,-dimethylaminophenyl)-1,3,4-oxadiazole; a polycarbonate resin sensitized with 2,4,7-trinitro-9-fluorenone, and polyvinylcarbazole sensitized with 2,4,7-trinitro-9-fluorenone, said binder being capable of transporting holes and electrons during exposure to said imagewise radiation but being incapable of generating holes and electrons sufficient to contribute substantially to formation of an electrostatic image during said imagewise exposure, said binder being capable of generating and transporting holes and electrons during exposure to wavelengths of radiation to which said binder is sensitive at an illumination level of more than about 5×10^{15} photons/cm² at substantially zero electrical field to cause discharging of said photoconductive layer sufficiently to allow recycling of said photoconductive layer in a recycling xerographic process.

4,076,529

PHOTOGRAPHIC DIFFUSION TRANSFER FILMS, PROCESSES AND COMPOSITIONS WITH COLOR MOIETY RELEASING COMPOUND

Lee J. Fleckenstein, and John Figueras, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 282,796, Aug. 22, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,751, Aug. 31, 1971, abandoned. This application Apr. 16, 1973, Ser. No. 351,673

Int. Cl. G03c 7/00, 5/54, 1/40, 1/10

U.S. Cl. 96—3 53 Claims

27. A process for producing a photographic transfer image in color comprising:

(a) imagewise-exposing a photosensitive element comprising a support having thereon a red-sensitive silver halide emulsion layer having associated therewith a cyan dye image-providing material, a green-sensitive silver halide emulsion layer having associated therewith a magenta dye image-providing material, and a blue-sensitive silver halide emulsion layer having associated therewith a yellow dye image-providing material, at least one of said dye image-providing materials being a *p*-sulfonamidoaniline or *p*-sulfonamidophenol compound having a diffusible color-providing moiety attached thereto through the sulfonamido group of said compound to the aniline or phenol moiety of said compound, said aniline or phenol moiety having a ballast group of such molecular size and configuration as to render said compound substantially nondiffusible during processing in an alkaline processing composition at a pH in excess of 11, said compound being alkali-cleavable upon oxidation to release said color-providing moiety from said aniline or phenol moiety;

(b) superposing over the layer outermost from the support of said photosensitive element a dye image-receiving layer coated on a support;

(c) Inserting an alkaline processing composition comprising a silver halide developing agent between said exposed photosensitive element and said dye image-receiving layer;

(i) thereby effecting development of each of said exposed silver halide developing agent;

(ii) said oxidized developing agent cross-oxidizing said sulfonamido compound;

(iii) said sulfonamido compound then cleaving, thus forming an imagewise distribution of diffusible color-providing moiety as a function of said imagewise exposure of each of said silver halide emulsion layers; and

(iv) at least a portion of said imagewise distribution or diffusible color-providing moiety diffusing to said image-receiving layer to provide an image; and

(d) separating said photosensitive element from said dye image-receiving layer coated on its said support.

4,076,530

DRY PHOTOGRAPHIC COPYING METHOD FOR PRODUCING TE IMAGES

Keiji Takeda; Kenji Matsumoto; Hiroshi Tamura; Masayoshi Nagata, and Masayoshi Tsuboi, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 5, 1976, Ser. No. 683,606

Claims priority, application Japan, May 7, 1975, 50-55074

Int. Cl.[2] G03C 5/54, 5/24, 1/48

U.S. Cl. 96—29 R 16 Claims

1. A method for producing a image comprising image-wise exposing a light-sensitive layer containing an image-forming reducing agent which reducing agent will be transferred to an image-receiving layer upon heating to 80 to 200° C at non-exposed areas and which is changed to a non-transferable compound at exposed areas, contacting said light-sensitive layer with said image-receiving layer containing an organic tellurium compound which can form a color image upon reaction with said image forming reducing agent, and heating said light-sensitive layer to transfer said image-forming reducing agent to said image-receiving layer at non-exposed areas, wherein said image-receiving layer comprises an organic tellurium compound and a binder formed on a support, said organic tellurium compound being reduced to Te during said method by transferred image-forming reducing agent from said non-exposed areas and wherein said organic tellurium compound is one which, when a mixture of the organic tellurium compound and the light-sensitive image-forming reducing agent is heated at 110–150° C, the mixture becomes dark.

4,076,531

IMAGE ANCHORAGE IN PHOTOGRAPHIC FILMS

Richard T. Crowell, Towanda, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 30, 1975, Ser. No. 600,369

Int. Cl.[2] G03C 5/00, 5/30, 1/76, 1/84

U.S. Cl. 96—35 17 Claims

1. A photosensitive drafting film comprising a polymeric film support bearing, in order, (1) a polymeric subbing layer, (2) an acrylic polymer layer, (3) a layer comprising gelatin and a surfactant, (4) an antihalation layer comprising gelatin and an actinic radiation-absorbing material, and (5) a wash-off gelatino-silver halide emulsion layer, at least one of said layers on said support containing a compound selected from the group consisting of cyclohexylamine, cyclohexane carbamic acid cyclohexylammonium salt, cyclohexylformamide, cyclohexyl-1,3-propanediamine, 3-cyclohexylamine-1-propane sulfonic acid, and cyclohexyl sulfamic acid.

4,076,532

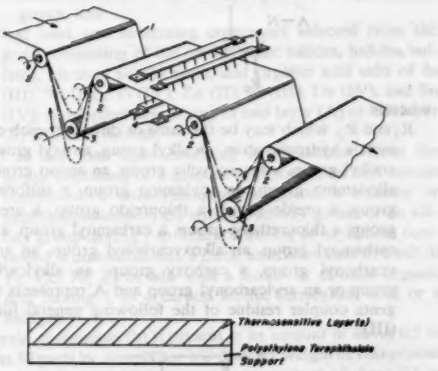
THERMOSENSITIVE IMAGE-FORMING ELEMENT AND METHOD OF PROCESSING THEREOF

William F. Gottermeier, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,604

Int. Cl.[2] G03C 5/24, 1/78

U.S. Cl. 96—48 HD 14 Claims



1. In a process for forming a visible image in a thermosensitive element comprising at least one thermosensitive image-forming layer and a biaxially-oriented, heatset polyethylene terephthalate film support by (1) heating said element at a processing temperature of at least 100° but not greater than 230° C while maintaining said support under tension in the range from about 50 psi to about 600 psi in its longitudinal dimension and unrestrained in its transverse dimension, and (2) thereafter cooling said element to below 100° C, the improvement wherein said support is one which expands from about 0.1 percent to about 1.3 percent in said transverse dimension and shrinks from about 0.2 percent to about 3.3 percent in said longitudinal dimension when it is subjected to heating in an unrestrained state for 6 seconds at said processing temperature,

and thereafter cooled to below 100° C, whereby necking of said element in its transverse dimension during said processing is reduced.

8. A thermosensitive image-forming element which exhibits reduced tendency toward necking upon heat processing under unidimensional tension in its longitudinal dimension, said element comprising (1) a biaxially-oriented, heatset polyethylene terephthalate film support which expands from about 0.1 percent to about 1.3 percent in its transverse dimension and shrinks from about 0.2 percent to about 3.3 percent in its longitudinal dimension upon being heated in an unrestrained state for 6 seconds at a temperature which is at least 100° but which does not exceed 230° C, and thereafter cooled to below 100° C, and (2) at least one thermosensitive image-forming layer.

4,076,533

SILVER HALIDE EMULSION CONTAINING TWO-EQUIVALENT COUPLER

Satoshi Ota; Kotaro Nakamura; Nobuo Sakai; Nobuo Furutachi, and Yukio Yokota, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

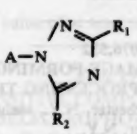
Filed Nov. 10, 1976, Ser. No. 740,449

Claims priority, application Japan, Nov. 10, 1975, 50-135310

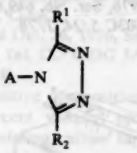
Int. Cl.² G03C *7/00, 1/40*

U.S. Cl. 96—56.5 **13 Claims**

1. A photographic silver halide emulsion containing a photographic coupler represented by the following general formula (I) or (II):



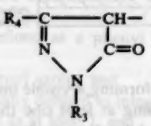
(I)



(II)

wherein

R_1 and R_2, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, an aralkyl group, a heterocyclic group, an amino group, an alkylamino group, an acylamino group, a sulfonamido group, a ureido group, a thioureido group, a urethane group, a thiourethane group, a carbamoyl group, a thiocarbamoyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a carboxy group, an alkylcarbonyl group or an arylcarbonyl group and A represents a magenta coupler residue of the following general formula (III):



wherein

R_3 has up to 40 carbon atoms and is selected from the group consisting of a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group and a cycloalkenyl group, in which each of these groups can be substituted with one or more of a halogen atom, a nitro group, a cyano group, an aryl group, an alkoxy group, an aryloxy group, a carboxy group, an alkylthiocarbonyl group, an arylthiocarbonyl group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfo group, a sulfamoyl group, a carbamoyl group, an acylamino group, a diacylamino group, a ureido group, a urethane group, a thiourethane group, a sulfonamido group, a heterocyclic group, an arylsulfonyl group, an alkylsulfonyl group, an arylthio group, an alkylthio group, an alkylamino group, a dialkylamino group, an anilino group, an N-arylanilino group, an N-alkylanilino group, an N-acylanilino group, a hydroxy group or a mercapto group; an unsubstituted aryl group, an aryl group substituted with one or more of a halogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, a nitro group, a cyano group, an aryl group, an alkoxy group, an aryloxy group, a carboxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, a sulfo group, a sulfamoyl group, a carbamoyl group, an acylamino group, a diacylamino group, a ureido group, a urethane group, a sulfonamido group, a heterocyclic group, an arylsulfonyl group, an alkylsulfonyl group, an arylthio group, an alkylthio group, an alkylamino group, a dialkylamino group, an anilino group, an N-alkylanilino group, an N-arylanilino group, an N-acylanilino group, a hydroxy group and a mercapto group; an unsubstituted heterocyclic group, a heterocyclic group substituted with one or more of the substituents above described for the aryl group; an aliphatic or aromatic acyl group; an alkylsulfonyl group; an arylsulfonyl group; an alkylcarbamoyl group; an arylcarbamoyl group; an alkylthiocarbamoyl group; or an aryl thiocarbamoyl group;

R_4 has up to 40 carbon atoms and is selected from the group consisting of a hydrogen atom, a straight chain or branched chain alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a cycloalkenyl group, an aryl group, a heterocyclic group, in which each of these groups can be substituted with one or more of the substituents above described for R_3; an alkoxycarbonyl group, an aryloxycarbonyl group, an aralkyloxycarbonyl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, a carboxy group, an acylamino group, a diacylamino group, an N-alkylacylamino group, an N-arylacylamino group, a ureido group, a urethane group, a thiourethane group, an arylamino group, an alkylamino group, a cycloamino group, a heterocyclic amino group, an alkylcarbonyl group, an arylcarbonyl group, a sulfonamido group, a carbamoyl group, a sulfamoyl group, a cyano group, a hydroxy group, a mercapto group, a halogen atom or a sulfo group.

4,076,534

HEAT DEVELOPABLE LIGHT-SENSITIVE MATERIAL

Yasuhiro Noguchi; Nobuyoshi Sekikawa; Kenji Sashihara, and Takao Masuda, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 515,375, Nov. 16, 1974, abandoned.

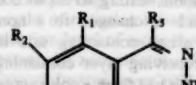
This application Jul. 26, 1976, Ser. No. 708,450

Claims priority, application Japan, Nov. 16, 1973, 48-116022; Nov. 17, 1973, 48-116471

Int. Cl.² G03C *5/24, 1/06, 1/02*

U.S. Cl. 96—63 **11 Claims**

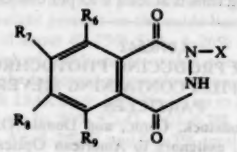
1. A process for forming images, which comprises imagewise exposing a light-sensitive material comprising a support having thereon at least one light-sensitive layer containing (1) an oxidation-reduction image-forming combination comprising (a) a silver salt oxidizing agent and (b) a reducing agent for said silver salt oxidizing agent (a) and (2) a catalytic amount of a light-sensitive silver halide or a compund capable of reacting with the silver salt oxidizing agent (a) to form a light-sensitive silver halide, the light-senstive layer further containing (3) at least one of a phthalazinone compound of the general formula (I)



(I)

wherein R_1, R_2, R_3 and R_4 each represents a hydrogen atom, an alkyl group, an alkoxy group, a nitro group, an amino group or a hydroxyl group; R_5 represents a hydrogen atom, a halogen atom, an alkyl group, an aryl group, a substituted alkyl group, a substituted aryl group, a benzylidenehydrazino group, a pyridyl group, a vinyl group or a 2-substituted vinyl group; and R_1, R_2, R_3, R_4 and R_5 are not all simultaneously hydrogen atoms, and

a 2,3-dihydro-9,4-phthalazinedione compound of the general formula (II)



(II)

wherein R_6, R_7, R_8 and R_9 each represents a hydrogen atom, a halogen atom, a hydroxyl group, an alkyl group, an aryl group, an amino group, an alkylamino group, a nitro group, an alkoxy group, an alkylthio group or an acylamido group; and X represents a hydrogen atom, an aryl group, a pyridyl group, a 2-(2-pyridyl)-ethyl group, a 2-(4-pyridyl)ethyl group, a benzoyl group or a methyl group, and then heating the exposed material at a temperature of about 90° to about 180° C for a period for about 1 to 60 seconds.

4,076,535

METHOD OF PREPARING SCREENS FOR SCREEN PRINTING

Paul R. Vander Putten, Brussels, Belgium, assignor to Carnation Company, Los Angeles, Calif.

Continuation of Ser. No. 421,369, Dec. 3, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,861

Int. Cl.² G03C *1/76*

U.S. Cl. 96—67 **6 Claims**

1. A method of preparing screens for use in screen process printing which comprises

applying a photosensitive liquid emulsion to a prestretched screen fabric so that the emulsion fills the mesh of the screen fabric and forms a layer of substantially uniform thickness on the outer surface of the screen fabric,

placing the liquid emulsion layer in line contact across the width of the layer with the end portion of a film of dry emulsion carried on a flexible backing sheet,

maintaining said line contact while drawing the liquid emulsion layer downwardly against the dry emulsion film until the entire surface of the dry emulsion film is in contact with and wetted by the liquid emulsion, and

drying the emulsion whereby the emulsion layer and emulsion film are coalesced into a unitary photosensitive emulsion layer having the screen fabric embedded therein.

4,076,536

DRY PHOTOPOLYMER IMAGING ARTICLE HAVING A DIAZONIUM SALT AND EPOXIDE COPOLYMER

Sheldon Irwin Schlesinger, East Windsor Township, Mercer County, and Ronald J. Boszak, Trenton, both of N.J., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 486,169, Jul. 5, 1976, Pat. No. 3,997,344. This application May 26, 1976, Ser. No. 690,310

Int. Cl.² G03C *1/54, 1/70, 1/94*

U.S. Cl. 96—75 **7 Claims**

1. A presensitized plate capable of being imaged comprising a substrate having applied to at least one surface thereof, a composition comprising (1.) (a) a copolymer of glycidyl acrylate and allyl glycidyl ether of (b) a terpolymer of glycidyl acrylate, glycidyl methacrylate and allyl glycidyl ether containing up to about 0.25 mole of glycidyl methacrylate per mole of glycidyl acrylate, said copolymers and terpolymers having an inherent viscosity of from about 0.09 to about 0.28; an epoxide equivalent of at least about 0.64 per 100 l grams of polymer and being substantially non-tacky at room temperature, tacky at elevated temperature and convertible to a non-tacky condition upon exposure to irradiation and

(2.) a radiation-sensitive aryl diazonium salt of a complex halogenide which decomposes upon exposure to irradiation to release a Lewis Acid effective to initiate polymerization of said copolymer or terpolymer, said radiation-sensitive salt being present in an amount sufficient to effect polymerization of said polymerizable material,

the surface of said coated substrate being non-tacky at room temperature.

4,076,537

LIGHT-SENSITIVE MATERIALS CONTAINING ORGANO TELLURIUM OR SELENIUM COMPOUNDS AND SENSITIZERS

Masayoshi Tsuboi, Asaka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jan. 2, 1976, Ser. No. 646,109

Int. Cl.² G03C *1/00, 1/52, 1/64*

U.S. Cl. 96—88 **15 Claims**

1. A light-sensitive material comprising a layer (A) containing:

(a) at least one organic compound containing tellurium or and/or selenium selected from the group consisting of

(i) an elemental compound in which tellurium or selenium is connected, directly or through a nitrogen or oxygen atom, to a carbom atom constituting a part of an organic group through a chemical bond, and which is capable of liberating tellurium or selenium on exposure and heating wherein said organic group is selected from the group consisting of (I) Ar-$COCH_2$-, (II) Ar-CH_2- and(III) R-$COCH_2$-, wherein Ar is an aryl group and R is an alkyl group or an aliphatic hydrocarbon group containing a carbonyl group; or

(ii) a tellurium or selenium complex composed of tellurium halide or selenium halide and an organic base group; and

(b) at least one sensitizing compound selected from the group consisting of the oxides, basic halides, halides, sulfates, nitrates, perchlorates, and organic acid salts of In (III), Sb (III), Ti (IV), Zn (II), Bi (III), Ge (IV), and Sn (IV); and further comprising in said layer (A) or in a layer (B) adjacent thereto,

(c) at least one light-sensitizing agent selected from the group consisting of a quinone compound, an aryl ketone compound, a tetracyanoquinodimethane, a benzene or naphthalene substituted with a hydroxy group or an alkoxy group having 1 to 7 carbon atoms, an arylamine compound, a diazonium salt, a metal acetoacetonate or a salt of Fe, Co, Ni, Zr or Mo with a mono- or di-basic organic acid having 1 to 4 carbon atoms, ferricyanic acid or a halogen

wherein component (b) is present in an amount of about 0.5 to about 50 parts by weight per 100 parts by weight of component (a) and component (c) is present in an amount of about 0.1 to about 100 parts by weight per 100 parts by weight of component (a).

4,076,538

PROCESS FOR CROSSLINKING HYDROPHILIC COLLOIDS WITH TRIAZINE COMPOUNDS

Norman Alfred Smith, Ilford, England, assignor to Ciba-Geigy AG, Basel, Switzerland

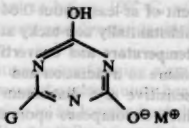
Filed Nov. 13, 1975, Ser. No. 631,566

Claims priority, application United Kingdom, Dec. 3, 1974, 52241/74

Int. Cl.² C09H *7/00*

U.S. Cl. 96—111 **11 Claims**

1. A process for cross-linking hydrophilic colloids which contain amino and/or hydroxyl groups, which comprises incorporating into the hydrophilic colloid as a cross-linking agent a compound of the formula



wherein G is a halogen atom and M is a cation.

4. A process according to claim 1 wherein the hydrophilic colloid is polyvinyl alcohol, gelatin or a gelatin derivative.

4,076,539
PROCESS FOR PREPARING SILVER HALIDE DISPERSIONS

Shinpei Ikenoue, and Takao Masuda, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 491,006, July 23, 1974, abandoned. This application Jun. 7, 1976, Ser. No. 693,670
Claims priority, application Japan, Jul. 23, 1973, 48-82851
Int. Cl.² G03C *1/38, 1/02*
U.S. Cl. 96—114.5 **21 Claims**

1. A process for preparing silver halide dispersion in the absence of a binder as a protective colloid which comprises reacting an aqueous solution of a compound capable of releasing halogen ions with an aqueous solution of a compound capable of releasing silver ions wherein said compound capable of releasing silver salt having a solubility of higher than about 0.2g/100g. H_2O at 20° C. to form a silver halide product wherein a surface active agent is present in the reaction mixture and wherein an organic solvent sightly soluble in water is added to one of said two solutions before said reaction or to the reaction mixture during said reaction or after said reaction wherein said organic solvent slightly soluble in water has a solubility of 10 parts or less per 100 parts of water at 20° C.

4,076,540
FIRE EXTINGUISHING COMPOSITION

Ernest Stossel, 203 W. 81st St., New York, N.Y. 10024

Filed Dec. 9, 1976, Ser. No. 748,724
Int. Cl.² C09D *5/18*; A62D *1/00*
U.S. Cl. 106—15 FP **17 Claims**

1. A fire extinguishing composition comprising (A) an ionic complex containing in an anionic portion of the molecule complexed nitrogen, phosphorus, oxygen, and aluminum, as evidenced by tests for anoinic nitrogen and aluminum, and having a P:N molar ratio of 10:1 to 2:6, a P:Al molar ratio of 1:1 to 100:1, an acid number less than 400, and a pH in a 2% aqueous solution above 2.5; (B) a boric acid compound selected from the group consisting of orthoboric acid, metaboric acid, and boric anhydride, and (C) urea.

7. A composition of reduced flammability comprising cellulose and a composition according to claim 1.

4,076,541
GLASSES SUITABLE FOR LASER APPLICATION, GLASS LASERS, AND METHOD FOR MAKING SAME

Charles F. Rapp, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 22, 1976, Ser. No. 669,067
Int. Cl.² C03C *3/16, 3/28, 3/30*
U.S. Cl. 106—47 Q **11 Claims**

1. A glass suitable for use as an active laser component and having a composition consisting essentially of

	Mole Percent
P_2O_5	39 - 65
Al_2O_3	4 - 13
K_2O	19 - 36
BaO	3 - 18.5
La_2O_3	0 - 3

and a laseable amount of Nd_2O_3 up to 6 mole percent, wherein the total moles of $P_2O_5+Al_2O_3+La_2O_3+Nd_2O_3$ is at least 50 and the transparency of the glass to light of a wavelength of 2.1 microns is at least 0.65 per cm. of thickness.

5. In the method for making a phosphate laser glass having Nd_2O_3 as the active lasing species and having at least 39 mole percent P_2O_5 which comprises melting the batch materials at elevated temperature in an atmosphere containing oxygen gas for a time sufficient to produce a homogeneous glass melt and thereafter cooling the melt to a solid glass, the improvement which comprises maintaining a dry atmosphere containing oxygen gas in contact with the melt during the final stages of melting for a time sufficient to produce a sufficiently dry glass such that the transparency thereof with respect to light of a wavelength of 2.1 microns is at least 0.65 per cm. of thickness.

4,076,542
PROCESS FOR PRODUCING PHOTOCHROMIC SILICATE GLASS FILM CONTAINING SILVER HALIDE PARTICLES

Emil W. Deeg, Woodstock, Conn., and Donald O. Hoffman, Sturbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed Jun. 4, 1976, Ser. No. 692,938
Int. Cl.² C03C *21/00*
U.S. Cl. 106—52 **8 Claims**

1. A process for producing photochromic silicate glass films, said process being characterized by the steps of:

1. preparing a light sensitive solution comprising a film forming silicate, silver ions, and a suitable solvent;
2. removing the solvent from said solution to form a silver ion impregnated silicate glass film; and
3. exposing the silicate to the vapors of halogen ions selected from the group consisting of chloride, bromide, iodide, and mixtures thereof to produce photochromic silver halide particles in said film.

4,076,543
GLASS FOR ENCAPSULATION OF DIODES

Pascal Adrien Jean Joly, Avon, and Jean-Claude Alphonse Henri Prat, Maincy, both of France, assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 30, 1977, Ser. No. 782,626
Claims priority, application France, Apr. 9, 1976, 76 10507
Int. Cl.² C03C *3/10*
U.S. Cl. 106—53 **1 Claim**

1. A glass suitable for the encapsulation of germanium or silicon crystal diodes exhibiting a softening point below about 550° C., a mismatch in thermal expansion with Dumet at about 400° C. of no more than about 200 PPM, and a viscosity at the liquidus of at least 20,000 poises consisting essentially, in weight percent on the oxide basis, of about

SiO_2	27-33
K_2O	2-6
PbO	62-70
K_2O + PbO	64-72
B_2O_3	1-4
GeO_2	0-4
$SiO_2 + B_2O_3 + GeO_2$	27-33
ZnO	0-4
PbO + ZnO	62-70

and being essentially free from Li_2O, Na_2O, Al_2O_3, and TiO_2.

4,076,544
COPPER-CADMIUM-SILVER PHOTOCHROMIC GLASS

David J. Kerko, and Paul A. Tick, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Jul. 28, 1976, Ser. No. 709,320
Int. Cl.² C03C *3/04, 3/08, 3/26*
U.S. Cl. 106—54 **3 Claims**

1. A photochromic glass article comprising a body of a silicate glass having in at least a portion thereof a separated photochromic phase including second phase droplets 300-100A in size containing third phase particles 20-50A in size, said separated phase containing copper, cadmium, silver, and at least one halogen selected from the group consisting of chlorine, bromine and iodine, said silicate glass having a composi-

tion which comprises, in weight percent as calculated from the batch, about 40–75% SiO_2, 4–26% Al_2O_3, 4–26% B_2O_3, 2–30% total of alkali metal oxides selected in amounts not exceeding the indicated proportions from the group consisting of up to 8% Li_2O, up to 15% Na_2O, up to 20% K_2O, up to 25% Rb_2O, and up to 30% Cs_2O, at least about 0.01% Ag, 0.03% CuO, 0.4% CdO, and 0.3% total of halogens selected from the group consisting of chlorine, bromine and iodine, and said glass exhibiting an absorption inflection at 370 nm and both optical bleaching and surface darkening properties.

2. A composition for a photochromic glass consisting essentially, in weight percent on the oxide basis, as calculated from the batch of about 40–75% SiO_2, 4–26% Al_2O_3, 4–26% B_2O_3, 2–30% total of alkali metal oxides selected in amounts not exceeding the indicated proportions from the group consisting of up to 8% Li_2O, up to 15% Na_2O, up to 20% K_2O, up to 25% Rb_2O and up to 30% Cs_2O, 0.03–0.7% CuO, 0.4–5% CdO, 0.03–0.7% Ag, 0–2% F, and 0.3–3% total of halogens selected from the group consisting of Cl, Br and I.

4,076,545

PROCESS OF PRODUCING CALCIUM ALUMINATE MONOSULFATE HYDRATE

Tomisaburo Azuma; Kazuto Ichimaru; Kouichi Tateno, and Takeru Murakami, all of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan

Filed Nov. 17, 1975, Ser. No. 632,596
Claims priority, application Japan, Nov. 15, 1974, 49-132187
Int. Cl.² C01B *17/96*
U.S. Cl. 423—544 11 Claims

1. A process of producing calcium aluminate monosulfate hydrate which consists essentially of reacting a mixture of a lime component, an alumina component selected from the group consisting of alumina, hydrated alumina, activated alumina, and aluminum hydroxide, a calcium sulfate component, and water at temperatures of 100°–200° C.

4,076,546

METHOD FOR PRODUCTION OF EXPANSIVE CEMENT

Yordan Todorov Simeonov, and Nikola Borissov Djabarov, both of Sofia, Bulgaria, assignors to Centralna Laboratoria Po Physiko-Chimicheska Mechanika pri Ban, Sofia, Bulgaria

Filed Dec. 17, 1976, Ser. No. 751,864
Claims priority, application Bulgaria, Dec. 30, 1975, 31971
Int. Cl.² C04B *7/35*
U.S. Cl. 106—89 2 Claims

1. A method for expanding cement compositions from portland cement and an expanding additive, which comprises dry mixing portland cement and an expanding additive containing 2 to 8% bialuminium pentachloride hydrate, and 4 to 15% gypsum.

4,076,547

POLYMERIC MOLDING COMPOSITION

David Lester, Arlington, and Robert R. Alexander, Milford, both of Mass., assignors to Polymerics, Inc., Waltham, Mass.

Filed Jun. 10, 1976, Ser. No. 693,023
Int. Cl.² C04B *11/00, 11/24;* C08L *1/08, 1/00*
U.S. Cl. 106—109 16 Claims

1. A polymeric molding composition admixed to have a quick initial set time and to have a delayed set time comprising:

a water soluble gel-forming polymeric compound selected from the group consisting of starches, modified starches and modified cellulosics, and having a functional group attached to a molecular unit having the ability to form an alkoxide;

at least one electrolytic salt selected from the group consisting of alkaline earth metal salts to act as an ionic initiator in the formation of said alkoxide and to modify reagent reaction rates;

a water-soluble gel-modifying alcoholic compound selected from the group consisting of diols, triols and other low to high molecular weight alcohols having more than one hydroxyl functional group; and

water to act as a solubilizing medium wherein said composition includes:

35–85 parts gel-forming polymeric compound by weight;

7–19 parts alkaline earth metal electrolytic salts by weight,

70–128 parts gel-modifying alcoholic compound by weight; and

140–210 parts water by weight.

4,076,548

HIGH BULKING CLAY PIGMENTS AND METHOD OF MAKING THE SAME

Wayne M. Bundy, Westfield; Joseph P. Berberich, Barnegat, and David Sastre, Elizabeth, all of N.J., assignors to Yara Engineering Corporation, Elizabeth, N.J.

Continuation-in-part of Ser. No. 591,851, Jun. 30, 1975. This application Dec. 27, 1976, Ser. No. 754,905
Int. Cl.² C04B *31/26*
U.S. Cl. 106—288 B 7 Claims

1. A method of improving the opacity of kaolinite comprising the steps of:

a. selectively flocculating a kaolinite in the presence of an effective amount of fine mica below 150 mesh in size to cause voids to occur between the particles of kaolinite to recover a mixture of ultrafine particle clay and mica mixture, and

b. collecting and drying the selectively flocculated ultrafine kaolinite and mica mixture as a high bulking dry pigment material.

4,076,549

AMORPHOUS PRECIPITATED SILICEOUS PIGMENTS FOR COSMETIC OR DENTIFRICE USE AND METHODS FOR THEIR PREPARATION

Satish K. Wason, Havre de Grace, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Division of Ser. No. 285,966, Sept. 5, 1972, Pat. No. 3,928,541. This application Feb. 18, 1975, Ser. No. 550,325
Int. Cl.² C09C *1/28*
U.S. Cl. 106—288 B 7 Claims

1. A method for producing amorphous, precipitated silicas which exhibit a low wet cake moisture content of less than 70%, and are characterized by their low structure, oil absorption of less than 125 cc/100 gm, valley abrasions of greater than 5 milligrams wire loss, and pack density of greater than 12 lb./cu.ft., said method comprising the steps of: providing an aqueous solution of an alkali metal silicate selected from the group consisting of sodium silicate, potassium silicate and lithium silicate, said silicate solution having a concentration of from 1.0 to about 2.5 lbs./gal., contacting the said silicate solution with an electrolyte salt of an alkali or alkaline earth metal to prepolymerize said silicate solution and to otherwise affect the size of the silica micelles such that they attach themselves to form particles and aggregates to thereby form a pre-polymerized reaction product having a silicon dioxide to alkaline metal dioxide molar ratio of about 2.3 to 2.7; introducing about one-half to about two-thirds of said pre-polymerized silicate solution to a stirred reaction vessel and heating to a temperature of about 100–200° F.; acidulating said pre-polymerized silicate solution in said reaction vessel by adding thereto a mineral acid, said acid being the same acid used to form said electrolyte salt, while simultaneously adding the remaining portion of the silicate solution therewith; continuing said addition of said acid and said silicate solution simultaneously to said reaction vessel in a manner such that a substantially constant pH of said reaction mass is maintained until the precipitation of said precipitated silica is substantially complete, continuing said acid addition to a final pH of from about 5.5 to 6.5, and recovering the precipitated silicas.

4,076,550

REINFORCING ADDITIVE

Friedrich Thurn, Bruhl; Kurt Burmester, Overath-Steinenbruck; Johannes Pochert, Walberberg, and Siegfried Wolff, Bruhl, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Division of Ser. No. 529,568, Dec. 4, 1975, Pat. No. 3,997,356, which is a division of Ser. No. 415,176, Nov. 12, 1973, Pat. No. 3,873,489, which is a continuation-in-part of Ser. No. 277,043, Aug. 1, 1972, Pat. No. 3,842,111. This application May 26, 1976, Ser. No. 690,150

Claims priority, application Germany, Aug. 17, 1971, 2141159; Aug. 17, 1971, 2141160; Mar. 14, 1972, 2212239

The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.

Int. Cl.[2] C09C *1/28*

U.S. Cl. 106—288 Q 15 Claims

1. A composition comprising (a) 0.1 to 50 parts of an organosilane compound having the formula

$$Z - alk - S_n - alk - Z,$$

in which Z is

(1)

(2)

wherein R_1 is alkyl of 1 to 4 carbon atoms, cyclohexyl or phenyl and R_2 is alkoxy of 2 to 8 carbon atoms, cycloalkoxy with 5 to 8 carbon atoms or alkylmercapto with 1 to 8 carbon atoms, alk is a divalent hydrocarbon of 1 to 18 carbon atoms and *n* is a number of 2 to 6, and (b) 10 to 250 parts of a siliceous filler.

4,076,551

CARBON BLACK-CONTAINING PIGMENTS AND PROCESS FOR THEIR PREPARATION

Horst Bernhard, and Reiner Esselborn, Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Dec. 10, 1976, Ser. No. 749,245

Claims priority, application Germany, Dec. 22, 1975, 2557796

Int. Cl.[2] C09C *1/00*

U.S. Cl. 106—291 14 Claims

1. In a particulate pigment comprising a substrate coated with a pigmentaceous coating which includes an amount of carbon black of between 0.1 and 25% by weight of the pigment, the improvement wherein the carbon black is embedded in a precipitated layer on the substrate of a pigmentaceous metal hydroxide or metal oxide or of bismuth oxychloride.

4,076,552

PROCESS FOR DECOLORIZING SUGAR SOLUTIONS WITH PEROXIDE

Souly Atalla Farag, and Lloyd Wendell Norman, both of Moses Lake, Wash., assignors to U and I Incorporated, Salt Lake City, Utah

Filed Aug. 24, 1976, Ser. No. 717,154

Int. Cl.[2] C13D *3/06, 3/10*

U.S. Cl. 127—50 7 Claims

1. A process for recovering sugar from a raw sugar-containing juice extracted from sugar-containing plant material, comprising adding lime, slaked lime, milk of lime, or saccharate milk to the juice; adding from about 0.01 to 0.4 percent by weight of peroxide selected from the group consisting of alkali metal peroxides and hydrogen peroxide to the juice; contacting the juice with sufficient carbon dioxide so that the pH of the juice is about 10.4 or greater, said addition of peroxide being made either prior to or simultaneously with the contacting of the juice with carbon dioxide; filtering the juice to remove precipitated calcium carbonate, together with colored matter, and color precursors, therefrom; treating the filtered juice with SO_2; concentrating the so treated juice by evaporation; and crystallizing sugar solids from the concentrated juice, whereby the sugar-containing juice is decolorized and rendered thermally stable relative to further color formation, and the viscosity and the bacterial content of the juice are reduced.

4,076,553

SPILL CONTROL COMPOSITION AND USE THEREOF

James W. Seidenberger, Bethlehem, Pa., assignor to J. T. Baker Chemical Company, Phillipsburg, N.J.

Filed Jan. 24, 1977, Ser. No. 761,888

Int. Cl.[2] B01J *23/06, 23/80;* B08B *7/00;* B01J *35/02*

U.S. Cl. 134—6 9 Claims

1. Metal wool plated with 0.5% by weight or more of zinc.

4,076,554

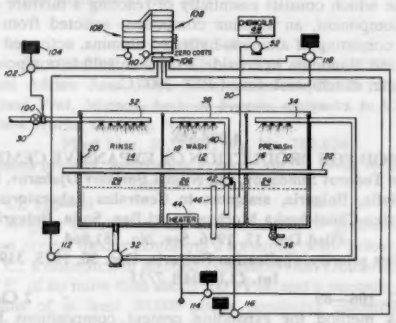
APPARATUS AND METHOD FOR DISPLAYING THE COST OF OPERATION OF A COMMERCIAL DISHWASHING MACHINE

Clyde R. Weihe, 17 Lindbergh Ave., Needham, Mass. 02192

Filed Nov. 1, 1976, Ser. No. 737,348

Int. Cl.[2] B08B *3/02*

U.S. Cl. 134—10 9 Claims



8. A method for monitoring the amount of costs attendant with a dishwashing operation where there is at least a wash step and a rinse step wherein articles to be cleaned are sequentially washed and rinsed in a wash zone and a rinse zone respectively, and pumps and valves provide for the movement of liquids through nozzles to effect the washing and rinsing of the articles, which method includes:

placing articles to be cleaned in a wash zone;

introducing water and chemicals into the wash zone;

contacting the articles to be cleaned with the water and chemicals;

measuring the cost of water and chemicals used to clean the articles;

providing a first liquid volumetric output corresponding to the cost of said water and chemicals;

transporting the articles from the wash zone to the rinse zone;

providing rinse water at a predetermined temperature to rinse said articles;

contacting the articles to be rinsed with the rinse water;

providing a second liquid volumetric output corresponding to the cost of the water used to rinse the articles, the basis of the cost of the water used in the rinse zone being identi-

cal to the basis of the cost of the water and chemicals used in the wash zone;

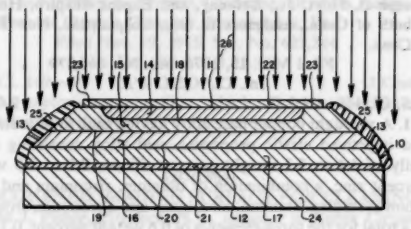
combining the first and second liquid volumetric outputs in a common receptacle; and

displaying visually the combined volume to reflect the total cost.

4,076,555
IRRADIATION FOR RAPID TURN-OFF REVERSE BLOCKING DIODE THYRISTOR

Chang K. Chu; John Bartko, both of Pittsburgh, and Patrick E. Felice, Jeannette, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 17, 1976, Ser. No. 686,857
Int. Cl.² H01L *21/263*
U.S. Cl. 148—1.5 **5 Claims**



1. A method of decreasing the turn-off time of a reverse blocking diode thyristor without significantly affecting other electrical characteristics comprising the steps of:

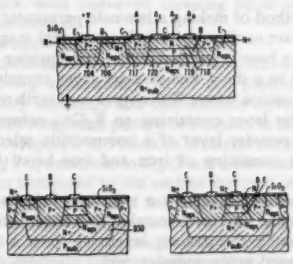
A. positioning a reverse blocking diode thyristor semiconductor body with a major surface thereof to be exposed to a radiation source; and

B. thereafter irradiating the reverse blocking diode thyristor semiconductor body with the radiation source to a dosage corresponding to between about 4×10^{13} and 2×10^{14} electrons/cm^2 with 2 MeV electron radiation.

4,076,556
METHOD FOR FABRICATION OF IMPROVED BIPOLAR INJECTION LOGIC CIRCUIT

Jorge Agraz-Guerena, Puebla, Mexico, and Alan William Fulton, Batavia, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 502,674, Sep. 3, 1974. This application Jun. 1, 1976, Ser. No. 691,594
Int. Cl.² H01L *21/265, 27/02*
U.S. Cl. 148—1.5 **6 Claims**



1. A method of manufacture of integrated semiconductor devices comprising the following steps which are performed in the stated order on a chip which comprises an epitaxial layer of one conductivity type overlying a substrate of the same conductivity type and having higher conductivity than said epitaxial layer:

a. By diffusion forming in the epitaxial layer a region of the opposite conductivity type extending through the epitaxial layer to the substrate and shaped to encircle a selected region of the epitaxial layer;

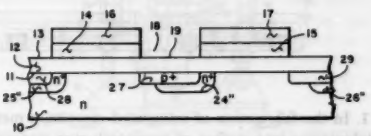
b. Implanting within said selected region a region of the said opposite conductivity type between, but spaced apart from, the surfaces of said epitaxial layer and extending only to said encircling region thereby forming in each encircled region a vertical three-element semiconductor device;

c. Forming for each encircled region a corresponding metallized contact at the exposed surface of the epitaxial layer and overlying a part of the corresponding encircled region.

4,076,557
METHOD FOR PROVIDING SEMICONDUCTOR DEVICES

Jack S. T. Huang, New Hope, Minn., and Susumu Kohyama, Kawasaki, Japan, assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 19, 1976, Ser. No. 715,737
Int. Cl.² H01L *21/26*
U.S. Cl. 148—1.5 **12 Claims**



1. A method for constructing a self-aligned conductively connected charge-coupled device through use of a first semiconductor material layer of a first conductivity type and of a first conductivity, said first semiconductor material layer having an outer major surface with a first insulating layer provided thereon, said first insulating layer having a first insulating layer surface not in contact with said outer major surface, said method comprising:

providing a plurality of sequential, spaced apart electrodes on said first insulating layer surface including first and second electrodes, said first and second electrodes, in being spaced apart as aforesaid, exposing between them a first area of said first insulating layer surface to thereby provide an electroded structure;

providing a first blocking material layer on said electroded structure where said first blocking material layer is capable, as provided and where not opened, of preventing implantation in said first semiconductor material layer of any kinds of ions which are to be implanted in said first semiconductor material layer in a manner set out in any implantation steps following in said method in which said first blocking material layer is present, said first blocking material layer having a first ion implantation opening therein which exposes only a portion of said first area;

implanting ions of a first kind in said first semiconductor material layer, as a first implantation, by impinging said first kind ions on said electroded structure with said first blocking material layer including impinging them through said first ion implantation opening to thereby form a first region in said first semiconductor material layer of a second conductivity type;

enlarging said first region by diffusion to become an enlarged first region of said second conductivity type and of a second conductivity which extends laterally in said first semiconductor material layer to locations therein both beyond projections of said first area in said first semiconductor material layer and within projections in said first

semiconductor material layer of a selected one of said first and second electrodes; and

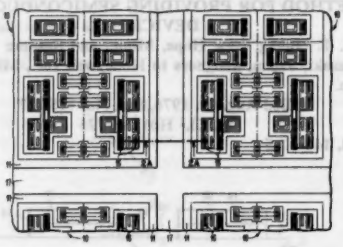
providing a second region in said first semiconductor material layer of a third conductivity type extending laterally in said first semiconductor material layer at least between projections therein of said first and second electrodes.

4,076,558

METHOD OF HIGH CURRENT ION IMPLANTATION AND CHARGE REDUCTION BY SIMULTANEOUS KERF IMPLANT

Hans Stephen Rupprecht, Yorktown Heights, and Robert Otto Schwenker, Hopewell Junction, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 31, 1977, Ser. No. 763,789
Int. Cl.[2] H01L *21/265, 21/461, 21/425*
U.S. Cl. 148—1.5 **10 Claims**



1. In the fabrication of integrated circuits, a method of ion implantation into wafers of semiconductor material having a plurality of spaced areas which are to be formed into a plurality of integrated circuit chips and a kerf area surrounding and separating said chips, said method comprising:

forming a layer of electrically insulative material over said wafer,

forming a plurality of openings through the insulative layer over said chip areas to expose the semiconductor wafer in said chip area openings,

forming openings through the insulative layer over said kerf area to expose the wafer kerf adjacent to the chip area openings, the total area exposed in the wafer kerf being greater than the total area exposed in said chip area openings,

directing a beam of ions at said wafer having sufficient energy to implant ions in the exposed wafer in said chip area and kerf openings, and

removing the kerf area to separate the wafer into a plurality of chips.

4,076,559

TEMPERATURE GRADIENT ZONE MELTING THROUGH AN OXIDE LAYER

Mike F. Chang, Liverpool; Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, all of N.Y., assignors to General Electric Company, Auburn, N.Y.

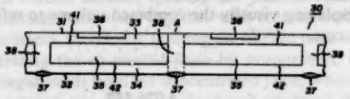
Filed Mar. 18, 1977, Ser. No. 778,859
Int. Cl.[2] H01L *21/225*
U.S. Cl. 148—1.5 **20 Claims**

1. A method of manufacturing semiconductor devices, said method comprising the steps of:

providing a body of semiconductor material, providing an oxide layer on at least selected portions of at least one surface of said body, the oxide of said oxide layer being selected from the group consisting of silicon oxide and germanium oxide;

selectively depositing an impurity material on said oxide layer; and

exposing said body to an elevated temperature and to a thermal migration temperature gradient through said



body and said oxide layer, whereby said impurity material thermally migrates through said oxide and said body.

4,076,560

WROUGHT COPPER-SILICON BASED ALLOYS WITH ENHANCED ELASTICITY AND METHOD OF PRODUCING SAME

Joseph B. Hoyt, Jr., Bethany, and Eugene Shapiro, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Mar. 15, 1976, Ser. No. 666,879
Int. Cl.[2] C22C *9/10*
U.S. Cl. 148—11.5 C **9 Claims**

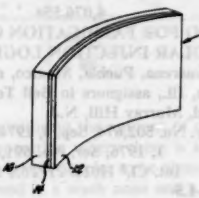
1. A wrought copper base alloy having high fatigue strength and improved elastic properties, said alloy consisting essentially of 4.4 to 5.2 weight percent silicon, 0.1 to 3.0 weight percent zinc, a combination of titanium, zirconium and chromium including titanium, zirconium and chromium, from 0.05 to a total for the three elements of 0.6 weight percent, 0.1 to 2.0 weight percent for a combination of cobalt and iron, balance copper.

4,076,561

METHOD OF MAKING A LAMINATED RARE EARTH METAL-COBALT PERMANENT MAGNET BODY

Robert W. Lee, Troy, and John J. Croat, Sterling Heights, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 15, 1976, Ser. No. 732,924
Int. Cl.[2] H01F *1/02*
U.S. Cl. 148—103 **4 Claims**



1. A method of making a laminate permanent magnet body having a rare earth metal-cobalt permanent magnet layer supported on a base layer, said method comprising

forming in a die a first powder layer containing an RCo_5 composition where R denotes a rare earth metal, a second powder layer containing an R_2Co_{17} composition, and a third powder layer of a composition selected from the group consisting of iron and iron-based ferromagnetic alloys,

subjecting the layers to a magnetic field to magnetically orient the rare earth metal-cobalt composition powder,

compressing the distinct layers to form a self-sustaining laminated green compact, and

sintering the compact at a temperature in the range of about 950° to 1200° C. to densify the compact, the thickness of the R_2Co_{17} layer in said compact being at least sufficient to form a continuous layer between the RCo_5 layer and the iron-containing layer.

4,076,562

EXPLOSIVE COMPOSITION WITH ADHERED AIR ENTRAPPING MATERIAL

Richard Wells Forsythe, 13601 Preston Road, Carillon Tower, Ste. 815W, Dallas, Tex. 75240

Filed Nov. 5, 1976, Ser. No. 739,282
Int. Cl.[2] C06B *45/34*
U.S. Cl. 149—7 38 Claims

1. An explosive composition comprising an air entrapment material supported by and adhering to the surfaces of a solid component and a combustible liquid contacting the surfaces of at least a portion of said air entrapment material, said combustible liquid being capable of sustained combustion in air.

4,076,563

EXPLOSIVE COMPOSITION FOR HIGH TEMPERATURE APPLICATIONS

Peter D. Zavitsanos, Norristown; Martin M. West, Philadelphia, and William G. Browne, Gladwyne, all of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Nov. 19, 1975, Ser. No. 633,244
Int. Cl.[2] C06B *33/00*
U.S. Cl. 149—37 3 Claims

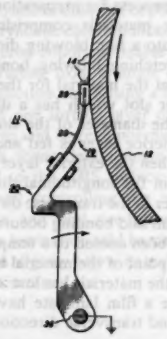
1. An explosive composition, which comprises thorium and molybdenum trioxide.

4,076,564

ROUGHENED IMAGING SURFACE FOR CLEANING

Donald J. Fisher, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 506,135, Sep. 16, 1974, Pat. No. 3,992,091. This application Mar. 5, 1976, Ser. No. 664,118
Int. Cl.[2] C23F *1/00*
U.S. Cl. 156—664 1 Claim



1. A method for making a photoconductive member with an imaging surface with improved cleaning blade cleanability comprising the steps of:

providing a smooth conductive substrate,

etching said substrate surface to form a surface on said substrate having substantially all of the substrate surface substantially uniformly and continuously covered with a first surface roughness pattern of recesses in the substrate surface averaging 3 to 5 microns in lateral dimensions and averaging 1 to 2 microns in depth and a substantially lesser amount as compared to the surface covered by said first surface roughness pattern but greater than zero of the substrate covered with a second surface roughness pattern, said second surface roughness pattern having recesses in the substrate surface of about 10 to 20 microns in lateral dimensions and averaging 1 to 2 microns in depth, and

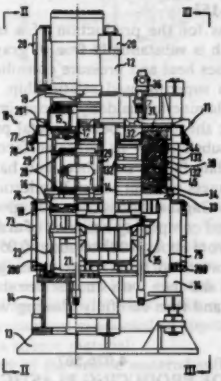
then uniformly overcoating said substrate with a thin uniform layer of photoconductive material which conforms to the substrate surface to form said imaging surface, to cause, a reduction in friction between said cleaning blade and said imaging surface without adversely affecting image reproduction.

4,076,565

MANUFACTURE OF MOULDED ARTICLES

Anthony Gerald Goodfellow, Erdington, England, assignor to Dunlop Limited, England

Division of Ser. No. 665,429, March 10, 1976, Pat. No. 4,006,053. This application Aug. 17, 1976, Ser. No. 715,116
Claims priority, application United Kingdom, Mar. 20, 1975, 11567/75
Int. Cl.[2] B29H *17/00*
U.S. Cl. 156—125 1 Claim



1. A method of moulding a pneumatic tire having sidewalls joined by a tread portion the method comprising:

locating at a filling station two transfer units, each unit comprising in its face remote from the other transfer unit a mould surface for one of the sidewalls, each unit comprising at least two parts relatively movable axially of the unit between an open position in which the volume of at least one reservoir for uncured rubber defined between said parts is relatively large and a closed position in which said volume is relatively small, and passageway means communicating the axially opposite faces of each unit with a reservoir thereof,

charging the reservoirs of the transfer units with moulding material at the filling station,

opening a press so that sidewall die members thereof are relatively spaced, the faces of the sidewall die members presented toward one another comprising mould surfaces for the sidewalls and locking spue grooves adjacent the mould surfaces,

locating the transfer units in the press so they are positioned between the sidewall die members with the sidewall mould surfaces of the transfer units presented towards the mould surfaces of the sidewall die members,

closing the press whereby a mould cavity for the tread portion is defined between the transfer unit and a mould cavity and locking spue groove for one of the sidewalls is defined between each sidewall die member and the mould surface of the adjacent transfer unit, each said cavity communicating with a passageway of at least one of the transfer units,

applying pressure to the closed press relatively to move the parts of each transfer unit to the closed positions thereof whereby moulding material is transferred from the reservoirs to the cavities via the passageways,

re-opening the press and removing the transfer units therefrom, the moulded tread portion remaining in the press and the moulded sidewalls being held on the respective sidewall die members by the moulded locking spues and

re-closing the press to bring the moulded sidewalls, held by the locking spues, into contact with the moulded tread portion on opposite sides of the latter and bonding the sidewalls to the tread portion, the method additionally comprising subjecting the moulding components of the press to superatmospheric pressure during the moulding operation and subsequent bonding operation.

4,076,566

METHOD OF PREPARING DECORATIVE TEXTURED LAMINATES

George Edward Power, Cincinnati, Ohio, assignor to Formica Corporation, Cincinnati, Ohio

Filed Jan. 28, 1976, Ser. No. 653,064
Int. Cl.[2] B32B *31/20;* B24C *1/10;* B32B *27/42*
U.S. Cl. 156—153 4 Claims

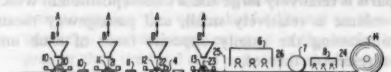
1. A process for the production of a textured decorative laminate which is substantially free of grayness and mottling which comprises heat and pressure consolidating an assembly comprising, in superimposed relationship, a supporting base member, a melamine-formaldehyde resin impregnated decorative, cellulosic sheet and a peened metal press plate having a texture over substantially its entire surface, the textured surface of said plate facing said sheet and having an arithmetic average roughness of from about 30 microinches to about 200 microinches, a Gardner Glossmeter 60° gloss of from about 20 to about 100 and comprising a myriad of craters having radii of curvature of from about 0.003 to about 0.050 inch, said texture having been provided by (1) first peening said surface with large size shot and then with smaller size shot or (2) first peening with shot and then carefully blasting with grit.

4,076,567

METHOD OF PRODUCING PLASTIC SHEETS WITH INTEGRATED GEOMETRIC DECORATIVE PATTERNS

Yoshinobu Yoshikawa, Suita; Kosuke Iida, Himeji; Tadayuki Morikawa, Hyogo, and Akinori Satomi, Himeji, all of Japan, assignors to Takiron Co., Ltd., Osaka, Japan

Filed Dec. 9, 1975, Ser. No. 639,021
Claims priority, application Japan, Dec. 28, 1974, 50-149154
Int. Cl.[2] B29C *27/02;* B29B *1/02*
U.S. Cl. 156—219 19 Claims



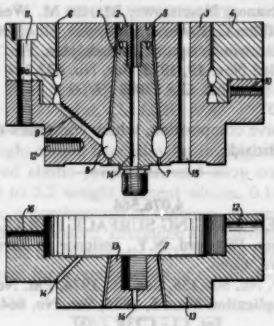
1. A method for producing resin sheets having geometric decorative patterns with individual patterns being substantially identical throughout the thickness thereof, which comprises depositing first colored resin particles into a pattern space defined by the surface of a support and a guide member extending downward from the bottom of a pattern screen and making an angle between 60° and 85° with the support; removing said guide member to leave a pre-formed pattern mass of said colored resin particles on said support; conveying intermittently with one or more movements said support having said pre-formed pattern mass thereon to a position such that said pre-formed pattern mass is below a subsequent pattern screen; depositing second colored resin particles into a second pattern space defined by said support and a guide member extending downward from said second pattern screen to form a second pre-formed pattern mass on said support; successively conveying said support having said pre-formed pattern masses thereon to subsequent additional pattern forming positions and repeating the steps for forming the resin particle pattern masses to produce a pre-formed sheet assembly comprising the desired number of separately formed pattern masses of colored resin particles; and heating the resulting pre-formed sheet assembly to sinter the resin particle masses in the sheet assembly, thereby producing a fused, integral sheet product having colored patterns extending in a substantially identical pattern configuration throughout the thickness of said sheet at least two of said colored patterns differing in color.

4,076,568

PROCESS FOR THE PREPARATION OF A MULTILAYER FILM

Josef Kubát, Solparksvagen 3, 171 35 Solna, and Kenneth S. Berggren, Delbancogatan 9 A, 413 35 Molndal, both of Sweden

Continuation of Ser. No. 448,640, Mar. 6, 1974, abandoned.
This application Nov. 11, 1975, Ser. No. 630,786
Int. Cl.[2] B30B *11/22;* B31B *31/30;* B29D *23/04*
U.S. Cl. 156—229 5 Claims



1. A continuous process for preparation of a multilayer film from thermoplastic materials comprising processing in an extruder, feeding into a film blowing die having at least two concentric slots, stretching, blowing, bonding and winding up, characterized in that the material for the exterior layer is fed through an exterior slot which has a diameter at least four times larger than the diameter of the slot through which the material for the interior layer is fed and that the layers are bonded together when the exterior layer has been oriented to the desired extent in the longitudinal direction by stretching and the interior layer in the transverse direction by blowing by means of gas medium said bonding occurring before any of the material layers has been cooled to a temperature which corresponds to the frost point of the material in question and otherwise before any of the materials has lost its viscous flowability, thereby to produce a film laminate having high strength in both longitudinal and transverse directions.

4,076,569

PROCESS FOR UPGRADING PLYWOOD PANELS

Arnold Buchbinder, 10331 Almayo, Los Angeles, Calif. 90064

Filed Apr. 14, 1976, Ser. No. 676,698
Int. Cl.[2] B05D *7/06, 3/12;* B29D *7/02*
U.S. Cl. 156—242 18 Claims

18. A process for coating the surface of a panel of cellulosic material which comprise the steps of:

feeding such a panel along a horizontal path;

applying a thermoplastic resin to the upper surface of said panel while maintaining said thermoplastic resin at a temperature above its melting point so that said resin remains liquid;

passing said panel beneath a doctor blade so that said liquid resin is spread across said upper surface and forms a resin layer completely across such surface;

maintaining the upper portion of the resin layer at a temperature sufficient to maintain such portion in a liquid, tacky condition while permitting the lower portion of the layer to cool and solidify;

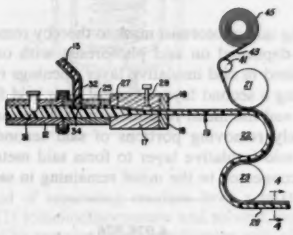
forming a smooth upper surface on said upper portion; and thereafter causing said upper portion to solidify.

4,076,570

PROCESS FOR THE PRODUCTION OF A MULTIPLE LAYER LAMINATE

Ronald D. Medley, Big Spring, Tex., and James R. Chapman, Atlanta, Ga., assignors to Cosden Technology, Inc., and Mead Corporation, Big Spring, Tex.

Filed Nov. 20, 1974, Ser. No. 525,480
Int. Cl.[2] B29G *3/00*
U.S. Cl. 156—244 17 Claims



1. A process for the manufacture of a laminated structure comprising a base layer of styrene polymer, an intermediate layer of an ABS polymer and a surface layer of a barrier material comprising a vinylidene chloride copolymer having copolymerized therein vinylidene chloride monomer and up to 30% of a monomeric material copolymerizable therewith comprising the steps of extruding from a single die orifice a a heat plastified laminate structure comprising a base layer of styrene polymer and at least one surface layer of an ABS polymer, capable of adhering to said styrene polymer with a bond of at least about 3 lbs/inch, thence laminating a pre-formed layer of said barrier material to the ABS surface layer(s) of said co-extruded laminate and controlling the temperature of said co-extruded laminate and said pre-formed layer of barrier material so that upon lamination said barrier material is heated to a temperature from slightly below its melting temperature to its degradation temperature.

4,076,571

METHOD OF BONDING ELECTROLYTIC DIAPHRAGMS OF PERFLUOROSULFONIC ACID RESINS

Steven J. Specht, Cleveland, and John O. Adams, Englewood, both of Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 19, 1976, Ser. No. 733,733
Int. Cl.[2] B32B *7/04, 17/04, 27/06*
U.S. Cl. 156—305 12 Claims

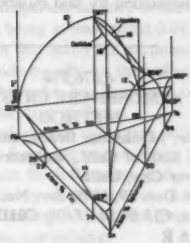
1. In a method for heat sealing an electrolytic diaphragm comprised of a perfluorosulfonic acid resin in the alkali metal ion form, said method comprising heat sealing juxtaposed sections of said electrolytic diaphragm, the improvement which comprises contacting said heat sealed sections of said electrolytic diaphragm with an aqueous fluid to restore elasticity to said heat sealed sections.

4,076,572

CRYSTAL GROWTH AND ANNEAL OF LEAD TIN TELLURIDE BY RECRYSTALLIZATION FROM A HETEROGENEOUS SYSTEM

Hiroshi Kimura, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 376,869, July 5, 1973, abandoned, which is a continuation of Ser. No. 176,157, Aug. 30, 1971, abandoned. This application Feb. 9, 1976, Ser. No. 656,548
Int. Cl.[2] B01J *17/02;* C01G *21/00;* C01B *19/00*
U.S. Cl. 156—603 9 Claims



1. A method for synthesizing at least a one cubic centimeter single crystal of lead tin telluride having the approximate composition of 40 mole percent lead, 10 mole percent tin, and 50 mole percent tellurium comprising the steps of:

reacting charge materials of lead, tin and tellurium at a temperature of approximately 950° C for approximately 4 hours in an enviroment evacuated to approximately 10^{-6} Torr to form a source material;

heating a quantity of the source material sufficient to form the single crystal at an isothermal temperature of approximately 850° C for a time span of approximately five to fourteen days in an enviroment evacuated to approximately 10^{-6} Torr to form the single crystal with an as-grown carrier concentration arising as a consequence of having vacancies in which metal vacancies predominate; cutting the single crystal into wafers; and

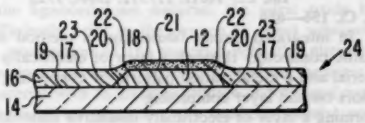
annealing wafers of the single crystal by heating the wafers for about 5 days at a temperature within the range of about 600° C to 660° C in a closed environment having a solid metal-rich source of lead, tin and tellurium vapors and having the composition of $(Pb_{1-x}Sn_x)_{0.51}Te_{0.49}$ wherein x is the mole fraction of tin approximately equalling the mole fraction of tin in the single crystal said source being in an atmosphere of inert gas at a pressure of one-third atmosphere, sufficient to establish and maintain an equilibrium vapor pressure over the wafers, corresponding to the annealing temperature, for a period of time sufficient to reduce the as-grown carrier concentration of the crystal.

4,076,573

METHOD OF MAKING PLANAR SILICON-ON-SAPPHIRE COMPOSITE

Joseph Michael Shaw, Middlesex, and Karl Heinz Zaininger, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 30, 1976, Ser. No. 755,966
Int. Cl.[2] H01L *21/205*
U.S. Cl. 156—613 3 Claims



1. A method for making a planar composite of at least one

silicon island imbedded in single crystal aluminum oxide comprising the steps of:

growing monocrystalline aluminum oxide adjacent an exposed surface of a substrate of sapphire and simultaneously growing polycrystalline aluminum oxide adjacent an exposed surface of an epitaxial island of silicon deposited on said substrate, by the pyrohydrolysis of aluminum trichloride, hydrogen, and carbon dioxide at a temperature between 875° C and 990° C, and

selectively removing said polycrystalline aluminum oxide whereby a major surface of said island is exposed and said island remains surrounded by said monocrystalline aluminum oxide.

4,076,574

REACTIVE ATMOSPHERE CRYSTAL GROWTH METHOD

Ricardo C. Pastor, Manhattan Beach, and Antonio C. Pastor, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 29, 1975, Ser. No. 645,866
Int. Cl.² B01J *17/08*; C01D *3/20*
U.S. Cl. 156—616 R **18 Claims**

1. A processing method for growing ultra pure laser quality single crystals from alkali metal halide powders selected from the group consisting of alkali metal chlorides, alkali metal bromides, and alkali metal iodides whereby material purification and crystal growth occurs in a continuous uninterrupted sequence, comprising:

charging a crucible with said powders and mounting said crucible in a furnace,

increasing the temperature of said furnace to a level sufficient to cause said powders to melt and remain molten thereby creating an environment which will ensure the dissociation of selected halogen source gasses which are subsequently introduced into said furnace,

purging contaminants from the interior surface of said crucible, which simultaneously scrubbing said molten charge to remove cation and anion impurities, by flowing a nascent halogen source gas, selected from the group whose formula is RY_nX_{4-n} where R is carbon, Y is a strongly covalently bonded atomic substituent, X is a halogen and n ranges from 1 to 3, having a dissociatable halogen which corresponds to the halide of the alkali halide being grown, in a carrier gas selected from the group consisting of He, CO_2 and mixtures of He and CO_2, through said furnace at a preselected carrier gas - halogen source material ratio and a gaseous flow rate based on the preselected halogen source material decay constant whereby the formation of nascent halogens is favored for an extended time interval ranging from 50 to 70 hours, and

causing a single crystal to be formed from said melt in the presence of said flowing halogen gas by slowly removing said crucible from said furnace and allowing said crystal to slowly cool to ambient temperature while maintaining a constant purge of said halogen gas.

4,076,575

INTEGRATED FABRICATION METHOD OF FORMING CONNECTORS THROUGH INSULATIVE LAYERS

Kenneth Chang, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,451
Int. Cl.² H01L *21/312*; B44C *1/22*
U.S. Cl. 156—656 **15 Claims**

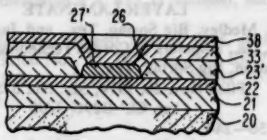
1. In integrated circuit fabrication, a method of forming metallic connectors through a layer of electrically insulative material and a metallization pattern for connecting such connectors on said layer comprising

forming a layer of electrically insulative material on a substrate,

forming on said insultative layer, a mask of photoresist material having a plurality of openings through which said insulative layer is exposed,

etching to selectively remove the exposed insulative layer to form insulative layer openings through which the underlying substrate is exposed,

depositing a first layer of metal over the masked substrate, said metal layer being thinner than said insulative layer whereby said insulative layer openings are partially filled with metal,



removing said photoresist mask to thereby remove the metal layer deposited on said photoresist with only the metal deposited in said insulative layer openings remaining,

depositing a second layer of metal over said first insulative layer and the metal remaining in said openings, and

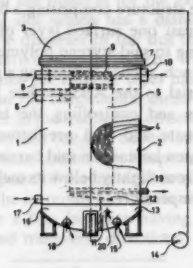
selectively removing portions of said second metal layer over said insulative layer to form said metallization pattern connected to the metal remaining in said openings.

4,076,576

METHOD AND APPARATUS FOR THE EVAPORATION OF LIQUIDS

Lauri Tapani Marttala, Varkaus, Finland, assignor to A. Ahlstrom Osakeyhtio, Finland

Filed Dec. 29, 1975, Ser. No. 644,714
Claims priority, application Finland, Jan. 20, 1975, 750130
Int. Cl.² B01D *1/22*
U.S. Cl. 159—13 B **13 Claims**



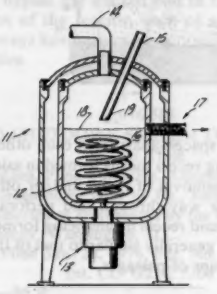
1. An apparatus for evaporating liquids which, when dilute, tend to froth during mixing or boiling, the apparatus having an evaporation chamber and in the chamber: a heat exchanger and means for causing the liquid to be evaporated to flow along the heat exchange surfaces of the heat exchanger in order to boil and concentrate the liquid, a feed inlet for feeding into the chamber the liquid to be evaporated, an outlet, in the lower part of the chamber, for removing the concentrated liquid, and an outlet, in the upper part, for removing the vapor from the chamber; and means for recirculating onto the heat exchange surfaces of the heat exchanger the concentrated liquid from the heat exchanger accumulated in the lower part of the chamber, and a member which divides the lower part of the evaporation chamber into two liquid compartments having a joint vapor space, said means for recirculating the concentrated liquid having the inlet connected to the first liquid compartment and to the feed inlet for the liquid to be expansion evaporated and the outlet for concentrated liquid having been connected to the second liquid compartment.

4,076,577

PROCESS FOR THE SEPARATION OF RESIDUES OF TOLUENEDIISOCYANATE PRODUCTION

Eckard Hetzel; Waldemar Koehler, both of Frankenthal; Georg Friedrich Vock, Ludwigshafen, and Rolf Bittler, Heidelberg, all of Germany, assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 3, 1975, Ser. No. 628,358
Claims priority, application Germany, Nov. 7, 1974, 2452805
Int. Cl.[2] B01D *1/00*
U.S. Cl. 159—47 R 11 Claims



1. A method of separating residues from a mixture of (1) residues and (2) toluenediisocyanate and solvent, said mixture being obtained by reaction of toluenediamine with phosgene in the presence of organic solvent, comprising the steps of

feeding the mixture to the central portion of an evaporator equipped with a helical agitator,

said evaporator being partly filled with residue and the temperature therein being maintained at least 5° C higher than the boiling point of the higher boiling component of the class consisting of toluenediisocyanate and solvent present in the mixture at the pressure within the evaporator,

agitating the mixture by rotating said helical agitator at a speed of 2–100 rpm. while the mixture is fed to said evaporator, and

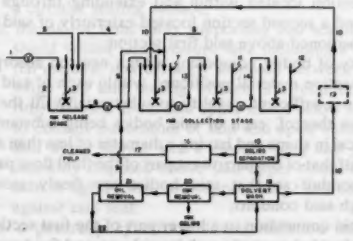
removing the volatile components of the mixture from the evaporator in vapor form.

4,076,578

INK REMOVAL FROM WASTE PAPER

Ira E. Puddington; Bryan D. Sparks, both of Ottawa, and Ernest A. Sexton, St. Catharines, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa and The Ontario Paper Company Ltd., St. Catharines, both of, Canada

Continuation-in-part of Ser. No. 516,775, Oct. 21, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 711,058
Int. Cl.[2] D21C *5/02*
U.S. Cl. 162—5 22 Claims



1. A method of treating waste inked paper to collect and remove ink particules therefrom comprising:

a. forming an aqueous pulp of said paper in the presence of soluble ink dispersing agent, said agent being at least one of a soap and sodium silicate, thereby releasing the ink particles adhering to the paper fibers and dispersing the ink solids in the pulp,

b. inactivating the ink dispersing agent present by precipitation with added insolubilizing cation, agitating the resulting aqueous mixture containing ink solids and paper fibers in the presence of inserted selected non-soap collecting solids and collecting ink solids on the surface of the collection solids, said collecting solids having hydrophobic surfaces with strong affinity for said ink solids, the collecting solids being dispersed directly in the aqueous pulp the collecting solids being at least about 0.04 mm. in diameter and large enough that many ink particles or agglomerates thereof adhere side-by-side on the collecting surface, the mixture being brought into intimate contact with the hydrophobic collecting surfaces,

c. separating the ink-coated collecting solids in easily handled solid form from the paper fibers by a mechanical separation without froth flotation, and

d. recovering relatively clean paper stock.

22. A method of treating waste inked paper to collect and remove ink therefrom, comprising:

a. forming an aqueous pulp of said paper and releasing the ink from the paper fibers to form fine dispersed ink solids in the pulp,

b. providing that no active ink dispersant is present and agitating the resulting pulp mixture in the presence of inserted sulphur solids having a diameter of at last about 10 micrometers until said sulphur solids pick up and retain a multiplicity of ink particles or agglomerates thereof side-by-side on the surfaces of the sulphur solids.

c. separating the ink-coated sulphur solids from the pulp by a mechanical separation without froth flotation, and

d. recovering the cleaned paper stock.

4,076,579

PULPING OF LIGNOCELLULOSIC MATERIAL BY SEQUENTIAL TREATMENT THEREOF WITH NITRIC OXIDE AND OXYGEN

David L. Brink, Berkeley, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

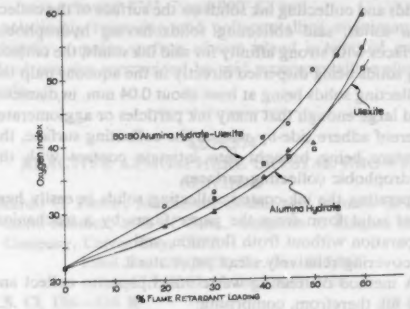
Continuation-in-part of Ser. No. 385,878, Aug. 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 149,589, Jun. 3, 1971, abandoned. This application Apr. 7, 1975, Ser. No. 565,524
Int. Cl.[2] D21C *3/16, 3/26*
U.S. Cl. 162—53 9 Claims

1. A process of preparing high strength pulp from particles of lignocellulosic material having a capillary structure which comprises treating said material with 2 to 8% nitric oxide, based on the dry weight of said material, and then reacting said nitric oxide treated material with molecular oxygen to form nitric acid in situ, said reaction being carried out at a temperature below 40° C for a time sufficient to substantially effect consumption of nitric acid and at a moisture content of 10 to 80% of the lignocellulosic material, the nitric oxide being added sufficiently prior to the oxygen to effect substantially thorough penetration of the material with the nitric oxide before reaction occurs with the oxygen, washing the nitric acid treated material with an alkaline solution and delignifying the washed material by extracting the washed material with a strong alkali at a temperature above about 140° C resulting in a cellulosic pulp.

4,076,580
FLAME RETARDANT CELLULOSIC BOARDS

Erwin Panusch, Livermore; Igor Sobolev, Orinda, and Stephen C. Carniglia, Byron, all of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Mar. 24, 1977, Ser. No. 780,725
Int. Cl.[2] D21D *3/00*
U.S. Cl. 162—159 11 Claims



Effect of Loading Levels on Flammability of Hardboard

1. A process for producing flame-retardant cellulosic board which comprises incorporating in the board furnish a synergistically acting flame-retarding composition consisting of alumina hydrate and ulexite, wherein the quantity of alumina hydrate in the composition is maintained within the range of about 30–70% by weight of the composition and wherein this composition is incorporated in the board in an amount corresponding to about 30–50% by weight of the total weight of the flame-retarded board and forming the flame-retarded board.

4,076,581
METHOD FOR INCREASING WET STRENGTH CURE RATE OF PAPER

Robert P. Avis, West Chester, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Jan. 16, 1976, Ser. No. 649,647
Int. Cl.[2] D21D *3/00*; D21H *3/24, 3/52*
U.S. Cl. 162—167 6 Claims

1. In a wet lay papermaking process employing a papermaking slurry containing a substantive urea-formaldehyde resin in the papermaking slurry for imparting wet strength to paper produced by depositing fibers contained in the slurry upon a foraminous surface with the water component of the slurry draining through the foraminous surface, the improvement which comprises;

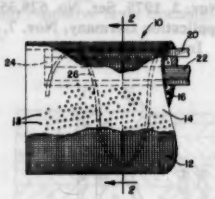
separately adding to the papermaking slurry a water soluble salt of carboxymethylcellulose and the substantive urea-formaldehyde, said carboxymethylcellulose having a degree of substitution of from about 0.3 to about 1.1 and added to the slurry in an amount sufficient to increase the wet strength cure rate of the paper.

4,076,582
SUCTION ROLL SEALING STRIP CLEANING STRUCTURE

James H. Burkhart, Monroe, Ohio, assignor to Diamond International Corporation, New York, N.Y.

Filed Apr. 4, 1977, Ser. No. 784,311
Int. Cl.[2] D21F *3/10*
U.S. Cl. 162—272 14 Claims

1. A self-cleaning suction roll assembly comprising a generally cylindrical shell having an outer radial surface, an inner radial surface, means defining groups of passages extending from said outer surface to said inner surface, and sealing means disposed within said shell and extending both longitudinally and circumferentially of said shell to define a pressure zone, said sealing means in operation of said suction roll assembly being in sealing engagement against said inner surface and secured at a fixed location whereby as said shell is rotated a sweeping action is effected between said inner surface of said shell and said sealing means, each of said groups of passages including a plurality of perforations formed in generally similar

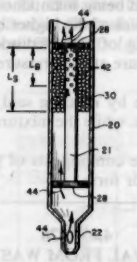


geometric patterns spaced-apart from each other in said shell, said shell also having recess means formed in said inner surface for reception and removal of fibers and/or other deleterious matter finding their way through said perforations and into said pressure zone, said recess means being formed in said inner surface in a pattern generally similar to that of the perforations of each of said groups of passages.

4,076,583
CONTROL FOR NUCLEAR REACTOR

Edward B. Ash, Marina Del Rey; Louis Bernath, San Diego, and Joseph V. Facha, Reseda, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 4, 1976, Ser. No. 729,539
Int. Cl.[2] G21C *7/16*
U.S. Cl. 176—35 5 Claims



1. A nuclear reactor comprising a pressure vessel, a core located within said vessel and containing a sufficient quantity of fissionable material to establish and sustain a chain-type fission reaction;

a plurality of elongated conduits disposed in a regular arrangement within said vessel, each of said conduits defining a fluid flow path and comprising;

a first section located within and extending through said core and a second section located exteriorly of said core and positioned above said first section;

a plurality of bodies comprising a high neutron absorption cross-section material positioned within each of said conduits in a sufficient quantity to substantially fill the first sections thereof, each of said bodies being substantially spherical in shape and having a diameter of less than about one-half that of the narrowest part of the fluid flow path of said conduit so that said bodies are freely movable through said conduits;

a first fluid connection to a lower part of the first section of each of said elongated conduits and a second fluid connection to an upper part of the second section of each of said elongated conduits and forming a hydraulically supported stacked bed of said bodies;

means for preventing movement of said plurality of bodies beyond said first and second sections of each of said elongated conduits; and

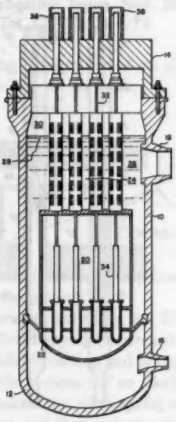
bypass means located intermediate said second fluid connection and said second section of each of said conduits, said bypass means including a plurality of fluid passageways distributed along the length of said second section to provide a ratio of the length of said second section provided with said fluid passageways to the length of said second section occupied by the stacked bed of said bodies of from about 0.5:1 to 1.2:1 for permitting a portion of said fluid to bypass the stacked bed of bodies during normal operation of the reactor, each of said plurality of fluid passageways having a cross-sectional area less than that of said bodies.

4,076,584

RODDED SHUTDOWN SYSTEM FOR A NUCLEAR REACTOR

Martin P. Golden, Penn Township, Allegheny County, and Aldo R. Govi, Greensburg, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 28, 1976, Ser. No. 653,175
Int. Cl.[2] G21C 7/08
U.S. Cl. 176—36 R **2 Claims**



1. A shutdown system for a nuclear reactor having a pressure vessel with an upper head, a support plate within said vessel, a vertically oriented core supported atop said support plate and means for circulating a coolant through said support plate and core, said system comprising:

a. a vertical pressure tube sealingly affixed to said head having an internal circumferential shoulder;

b. an upper radiation shield disposed within said tube having a circular seating surface;

c. means for removably supporting and sealing said upper shield within said pressure tube including a circumferential metallic seal matingly disposed between said support ledge and said seating surface, a circumferential spring ring disposed about said upper shield below said seal sized to contact the bottom of said seal upon vertical lifting of said upper shield, and a closure plug and jacking bolts assembly disposed above said upper shield and positionable to tightly seat said support ledge and seating surface against said seal;

d. a generally cylindrical lower radiation shield sized to removably fit within said outer pressure tube and having a vertical opening therethrough, said lower shield disposed at the elevation of said head;

e. an inner tube arranged concentrically within said pressure tube sealingly affixed at its upper portion to said upper shield, and at its lower portion to said lower shield;

f. an electromagnet assembly sealingly affixed within said inner tube below and spaced from said upper shield and above said lower shield having a vertical aperture therethrough;

g. an inner shaft sealingly affixed to said electromagnet assembly extending from the upper end of said electromagnet downward through said aperture;

h. an inner tubular wall sealingly affixed to said electromagnet assembly and said lower shield forming a pressurized gas annulus between said inner tube and said inner tubular wall;

i. a magnetically responsive armature sized to matingly abut the bottom of said electromagnet within the magnetic flux formed by said electromagnet, said armature having a vertical opening through which said inner shaft passes;

j. a main shaft affixed to said armature surrounding said inner shaft throughout the length of said inner shaft, and said main shaft extending through said lower shield opening;

k. a set of metallic bellows disposed concentrically about said main shaft and within said inner tubular wall sealingly affixed at the top to said armature and at the bottom to said lower shield so as to form a pressure bearing bellows annulus between said set and an atmosphere annulus between the outer bellows of said set and said inner tubular wall;

l. a flexible shaft affixed to the bottom of said main shaft;

m. a neutron absorbing control rod coupled to said flexible shaft;

n. tubular means for conducting said coolant affixed at the top to said lower shield and terminating at the bottom in an inlet nozzle receiving said circulating coolant from below said support plate;

o. means for selectively conducting and venting a pressurized gas between the top of said pressure tube and the bottom of said bellows annulus including, in series, a conduit passing through said upper shield and affixed to said electromagnet assembly, an upper passageway through said electromagnet assembly to said pressurized gas annulus, and a lower passageway through said lower shield from said last-named annulus to said bellows annulus;

p. means for allowing fluid communication between the atmosphere surrounding the top of said pressure tube and said atmosphere annulus including, in series, an opening extending vertically through said upper shield and a magnet passageway through said magnet to said atmosphere annulus; and

q. means for conducting electrical energy from atop said pressure tube to said electromagnet assembly including a conduit for containing electrical leads which passes vertically through said top shield and to said electromagnet assembly.

4,076,585

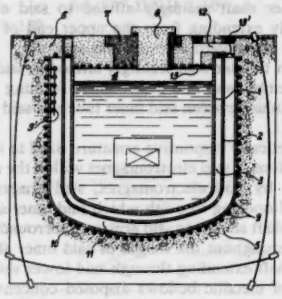
METHOD OF CONTINUOUS TESTING FOR LEAK-TIGHTNESS AND MECHANICAL RESISTANCE OF A REACTOR VESSEL JACKET AND A REACTOR IN WHICH SAID METHOD IS EMPLOYED

Pierre Charles Cachera, Saint German en Laye, France, assignor to Electricite de France (Service National), Paris, France

Continuation of Ser. No. 500,558, Aug. 26, 1974, abandoned. This application Jun. 8, 1976, Ser. No. 693,879
Claims priority, application France, Sep. 7, 1973, 73 32374
Int. Cl.[2] G21C 9/00
U.S. Cl. 176—38 **4 Claims**

1. A method for continuous testing of the leak-jacket of a sodium-cooled fast reactor of the type comprising a first enclosure or primary vessel which contains the reactor core and the sodium and above which is located an inert gas blanket, and a second enclosure or leak-jacket which surrounds said first enclosure, both enclosures being placed within a safety enclo-

sure which is closed at the top by a shield slab, the steps of filling the space between the two first enclosures with an inert gas, maintaining the inert gas at a pressure substantially equal to atmospheric pressure, the second enclosure being under the same conditions of restraint as the first enclosure, maintaining



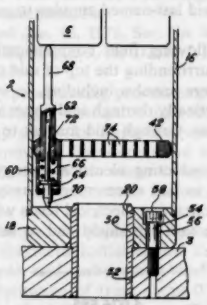
a vacuum within the space between said second enclosure and said safety enclosure, and continuously testing the leak-tightness and mechanical resistance of said enclosure by detecting any loss of vacuum within the space between said second enclosure and said safety enclosure by leaking of the inert gas into said space.

4,076,586

NUCLEAR REACTOR OF THE PRESSURIZED WATER TYPE

Jean Bideau, Breuillet; Jacques Levy, Paris, and Jean-Luc Viaud, Bures-sur-Yvette, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 21, 1976, Ser. No. 725,063
Claims priority, application France, Oct. 2, 1975, 75 30244
Int. Cl.[2] G21C *3/30, 3/06;* F16G *11/00*
U.S. Cl. 176—78 **12 Claims**



1. A nuclear reactor comprising a pressure vessel and, within said vessel,

a lower grid for supporting the reactor core, said grid being rigidly fixed to said vessel,

a plurality of fuel wrappers each adapted to contain at least one fuel assembly, each wrapper being designed in the shape of a right-angled parallelepiped, said wrapper being open at the upper end and closed at the lower end by a base plate provided with a bore,

said fuel assemblies being each provided with an upper end component which rests on the upper end of one of said fuel wrappers,

said lower support grid being such as to have a top face and provided with sleeves equal in number to that of the fuel wrappers, said sleeves being intended to project from said top face of said lower support grid, each sleeve being adapted to penetrate into a bore of a base plate of a fuel wrapper, said sleeve being fabricated from a material having a higher coefficient of thermal expansion than the material forming the base plate of said fuel wrapper, the external diameter of said sleeve being smaller in the cold state than that of the bore of the base plate and equal thereto at the operating temperature of the reactor so that there should take place at this temperature between said sleeve and the bore of said base plate a take-up of play by thermal expansion and an effect of clamping of said fuel wrapper, and

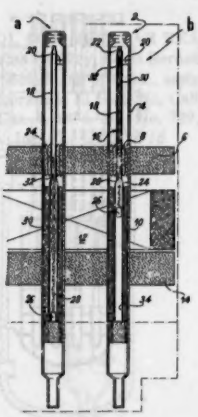
a plurality of maintaining units for locking said fuel assemblies in position within said fuel wrappers in a resilient manner.

4,076,587

FUSE AND APPLICATION OF SAID FUSE TO THE CONSTRUCTION OF AN EMERGENCY SHUTDOWN SYSTEM FOR A NUCLEAR REACTOR

Hubert Henri Léon Taulier, Maisons Laffitte, and Gérard Brugeille, Chatou, both of France, assignors to Electricite de France (Service National), Paris, France

Division of Ser. No. 469,907, May 14, 1974, Pat. No. 3,981,598.
This application Mar. 1, 1976, Ser. No. 662,911
Int. Cl.[2] G21C *7/12*
U.S. Cl. 176—86 R **5 Claims**



1. A coupling device between two components of elongate shape, said device having a first state corresponding to the coupling of said components and a second state corresponding to the breaking of said coupling device, to initiate the shutdown of a fast nuclear reactor of the liquid sodium cooled type having a core region by the introduction by gravity of solid neutron absorbing material into the core region, said absorbing material being normally maintained above the core region by one of said two components when said coupling device is in the first state, said coupling device breaking if a given physical characteristic of the core region of the reactor exceeds a predetermined threshold value, so that said absorbing material falls into the core region, said coupling device comprising in combination with said nuclear reactor a first element, a second element and separating means between said first and second elements to physically separate said first and second elements, said first element providing a mechanical connection between the two components, said first element being a material which retains its mechanical properties when said physical characteristic is below said threshold value, said second element being a material generating heat when said physical characteristic attains said threshold value and causing when fused and in contact with the material of said first element an exothermic reaction with said material producing a temperature which is

higher than the melting point of the material of said first element and also the formation of an alloy of the materials of said two elements, said alloy having a melting point below said threshold value, and said separating means separating said first element from said second element when said characteristic is below said threshold value and allowing contact of said materials of said first and second elements after melting of said material of said second element, said contact causing breaking of said coupling device corresponding to the second state and the fall by gravity of the neutron absorbing material into the core region of the nuclear reactor.

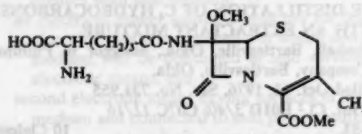
4,076,588

ANTIBIOTIC SF-1623 SUBSTANCE AND THE PRODUCTION THEREOF

Shigeharu Inouye; Takashi Shomura, both of Yokohama; Michio Kojima, Tokyo; Yasuaki Ogawa, Yokohama; Hiroshi Watanabe, Yokohama; Yasumitsu Kondo, Yokohama, all of Japan; Kazuo Saito, deceased, late of Fujisawa, Japan (by Nobuko Saito, administrator); Yujiro Yamada, and Taro Niida, both of Yokohama, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Division of Ser. No. 526,731, Nov. 25, 1974, Pat. No. 4,010,155. This application Jul. 8, 1976, Ser. No. 703,589
Claims priority, application Japan, Nov. 28, 1973, 48-132594
Int. Cl.² C12D *9/14*
U.S. Cl. 195—36 C 4 Claims

1. A process for the production of an alkali metal salt of SF-1623 substance having the formula:



wherein Me is selected from the group consisting of sodium, potassium, and ammonium,

which process comprises cultivating an SF-1623 substance-producing strain of *Streptomyces chartreusis* in a culture medium containing assimilable carbon and nitrogen sources under aerobic conditions in the presence of an alkali metal thiosulfate to produce and accumulate the alkali metal salt of the SF-1623 substance in the culture, and then isolating the salt form of this antibiotic from the culture.

4,076,589

PROCESS FOR THE PRODUCTION OF DIHYDROXYACETONE

William Charney, Montclair, N.J., assignor to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 364,771, May 29, 1973, abandoned. This application Jul. 17, 1975, Ser. No. 596,935
Int. Cl.² C12D *1/10*
U.S. Cl. 195—49 9 Claims

1. A method for producing dihydroxyacetone which comprises cultivating *Acetobacter suboxydans* under submerged aerobic conditions for from about 24 to about 48 hours in a fermentation medium consisting of water, from about 5% to about 15% of glycerol, from about 0.2% to about 1.0% of a single nutrient selected from the group consisting of yeast hydrolysate and fish hydrolysate at a temperature of from about 27° C to about 33° C, at a pH from 3.3 to 4.3 wherein said percentages are weight to volume, and isolating the dihydroxyacetone therefrom to obtain thereby from about 75 to about 90% by weight based upon the glycerol added.

4,076,590

PROCESS FOR ENHANCING THE PRODUCTION OF ENTEROTOXIN BY *VIBRIO CHOLERAE*

Mark H. Levner, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 607,649, Aug. 25, 1975, Pat. No. 3,984,285. This application May 14, 1976, Ser. No. 686,617
Int. Cl.² C12D *13/02*
U.S. Cl. 195—96 1 Claim

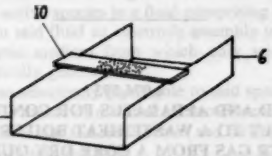
1. A process for producing *Vibrio cholerae* enterotoxin comprising growing *Vibrio cholerae* Inaba 569B [ATTC 25870] in the presence of lincomycin.

4,076,591

METHOD IN MICROBIOLOGICAL ANALYSIS

Carl-Goran Heden, Solna Kyrkvag 11, Solna, Sweden

Filed Jan. 12, 1976, Ser. No. 648,024
Claims priority, application Sweden, Jan. 15, 1975, 75003905; Oct. 7, 1975, 75111963
Int. Cl.² C12K *1/04*
U.S. Cl. 195—103.5 K 6 Claims



1. Method of microbiological analysis wherein a simultaneous study is to be made of the effect of a number of different reagents on a strain of microorganisms comprising the steps of:

a. forming an elongated plate of a substrate material which comprises a culture medium combined with a microorganism strain to analyzed;

b. simultaneously inserting in a transverse direction into said elongated substrate plate a plurality of troughs, said troughs comprising a bottom and two opposite side walls but being open in the direction of said inserting, the bottom and side walls of the troughs constituting a plurality of completely isolated segments of substrate containing samples of said strain of microorganisms, and;

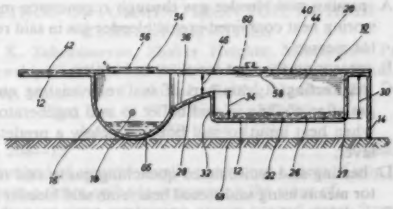
c. introducing substantially simultaneously with said partitions a plurality of reagents for reaction with the microorganisms in the isolated segments of substrate.

4,076,592

METHOD AND APPARATUS FOR TESTING THE EFFECT OF VARIOUS ANTIBIOTICS ON A BACTERIAL SUSPENSION

Rex L. Bradley, 6620 Manor Road, Austin, Tex. 78751

Filed Jun. 21, 1976, Ser. No. 698,487
Int. Cl.² C12K *1/04*
U.S. Cl. 195—103.5 K 16 Claims



1. Apparatus for testing a substance comprising:

a substantially planar base;

a reservoir carried by said base and having an axis extending therethrough;

a plurality of side-by-side test zones carried by said base, each test zone having a chemical substance therein, each of said test zones being separated from its next adjacent test zone by a sidewall, each sidewall extending upwardly above a predetermined point in each test zone for a first predetermined distance, each of said test zones being adjacent to and in fluid communication with said reservoir; and,

a barrier disposed between each of said test zones and said reservoir, said barrier extending upwardly above said predetermined point in each test zone for a second predetermined distance less than said first predetermined distance;

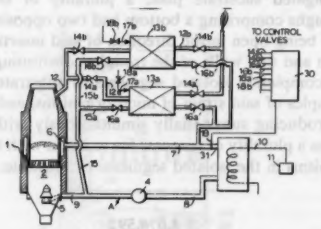
said test zones, reservoir and barrier being cooperably arranged so that a substance to be tested disposed in said reservoir may be introduced therefrom over said barrier and into each of said test zones by the angular movement of said base about said axis extending through said reservoir.

4,076,593

METHOD AND APPARATUS FOR CONTROLLING HEAT INPUT TO A WASTE HEAT BOILER BY USE OF BLEEDER GAS FROM A COKE DRY QUENCHING STATION

Kunihei Koizumi; Takeshi Ueda, both of Yokohama, and Tatu Otani, Yokosuka, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 12, 1977, Ser. No. 758,864
Claims priority, application Japan, Jan. 13, 1976, 51-2424
Int. Cl.² C10B *39/02*
U.S. Cl. 201—39 **8 Claims**



1. In a coke dry quenching system having a waste heat boiler wherein heated quenching gas drawn from the quenching station is cooled and recirculated for use in subsequent quenching operations, and having means for bleeding gas from the top of the quenching station, the method of controlling heat input to said boiler comprising the steps of

A. passing said bleeder gas through regenerator means for storing heat contained in said bleeder gas in said regenerator means;

B. measuring the heat input to said boiler;

C. redirecting at least part of said recirculating quenching gas after cooling in said boiler to said regenerator means when heat input to said boiler is below a predetermined level;

D. heating said recirculated quenching gas in said regenerator means using said stored heat from said bleeder gas; and

E. supplying the recirculated gas after heating in said regenerator means to the input of said boiler thereby to maintain substantially constant the heat input to said boiler.

4,076,594

PURIFICATION OF FORMIC ACID BY EXTRACTIVE DISTILLATION

Horst Buelow, Frankenthal; Heinz Hohenschutz, Mannheim; Johannes E. Schmidt, and Werner Sachsze, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Oct. 4, 1976, Ser. No. 729,858
Claims priority, application Germany, Oct. 11, 1975, 2545730
Int. Cl.² B01D *3/40*; C07C *51/44*
U.S. Cl. 203—15 **4 Claims**

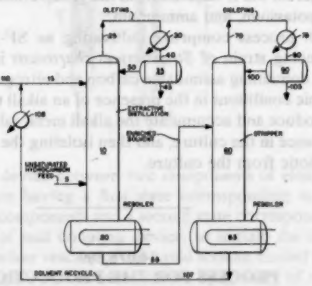
1. A process for recovery of formic acid from its aqueous solution which comprises vaporizing said aqueous solution of formic acid, passing the vapor into the middle zone or a lower zone of a distillation column and passing a liquid basic extractant into the top of said column, distilling off water from said column, extracting the formic acid in said extractant as it passes downwardly through the column, the extractant forming a liquid bottoms product, using N-formylmorpholine as the extractant, removing the bottoms product containing the formic acid from said column, and distilling off formic acid from said removed bottoms product in a second distillation column.

4,076,595

EXTRACTIVE DISTILLATION OF C_4 HYDROCARBONS WITH AN EXTRACTANT MIXTURE

Donald M. Haskell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 13, 1976, Ser. No. 731,955
Int. Cl.² B01D *3/40*; C07C *11/16*
U.S. Cl. 203—51 **10 Claims**



1. A process for separating a mixture containing olefins and diolefins which comprises:

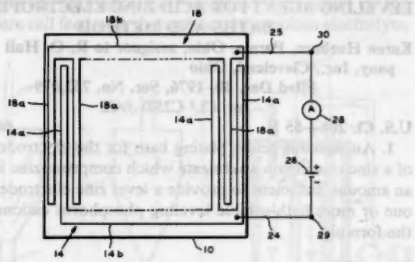
a. introducing the mixture together with a selective solvent comprising methylethylsulfone and at least one solvent modifier selected from the group including methylethylketone, acetone, and tetrahydrofuran into a fractionation zone having a top and a bottom and therein subjecting the mixture, methylethylsulfone and the solvent modifier to extractive distillation conditions including such pressure and corresponding temperature to separate these into a column overhead containing substantially all olefin and an extract bottoms containing mainly diolefin and the selective solvent; and

b. withdrawing a column overhead stream containing substantially all olefin and an extract bottoms stream containing mainly diolefin and the selective solvent.

4,076,596
APPARATUS FOR ELECTROLYTICALLY DETERMINING A SPECIES IN A FLUID AND METHOD OF USE

James Gerard Connery, North Wales; Emil Christopher Muly, Doylestown, and Robert Morgan Taylor, Lansdale, all of Pa., assignors to Leeds & Northrup Company, North Wales, Pa.

Filed Oct. 7, 1976, Ser. No. 730,409
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—1 T 10 Claims



1. In an electrode assembly for measuring the concentration of oxygen in a fluid of the type which includes in combination:
an electrolytic medium;
first electrode means having surfaces in contact with said medium;
barrier means for separating said medium from said fluid, and being selectively permeable to said oxygen, and in contact with said medium;
an electrical power source connected for biasing said first electrode means at a potential at which said oxygen in said medium will be consumed at said surfaces of said first electrode means; and
second electrode means having surfaces in contact with said medium and connected to said power source for completing a circuit in which a current from said source can flow through both said electrode means at a level which is a function of such consumption;
said second electrode means and said medium being such that with the combination substantially only said oxygen is electrolytically generable at said second electrode means at said current level, said second electrode means being biased by said power source at a potential at which said oxygen is generable from said medium; the improvement comprising,
the positioning of said second electrode means with respect to said first electrode means so that said surfaces of said first electrode means are interleaved in side by side relationship with said surfaces of said second electrode means with said surfaces of said electrodes equidistant from said barrier means and the periodicity of said positioning sufficiently small with respect to the thickness and permeability of both said barrier means and said medium to oxygen so that the oxygen generated at said second electrode is consumed at said first electrode without any substantial transfer of oxygen across the interface between said barrier means and said fluids.

9. In an electrode assembly for measuring the concentration of chlorine in a fluid of the type which includes in combination:
an electrolytic medium;
first electrode means having surfaces in contact with said medium;
barrier means for separating said medium from said fluid, and being selectively permeable to said chlorine, and in contact with said medium;
an electrical power source connected for biasing said first electrode means at a potential at which said chlorine in said medium will be consumed at said surfaces of said first electrode means; and
second electrode means having surfaces in contact with said medium and connected to said power source for completing a circuit in which a current from said source can flow through both said electrode means at a level which is a function of such consumption;
said second electrode means and said medium being such that with the combination substantially only said chlorine is electrolytically generable at said second electrode means at said current level, said second electrode means being biased by said power source at a potential at which said chlorine is generable from said medium; the improvement comprising,
The positioning of said second electrode means with respect to said first electrode means so that said surfaces of said first electrode means are interleaved in side by side relationship with said surfaces of said second electrode means with said surfaces of said electrodes equidistant from said barrier means and the periodicity of said positioning sufficiently small with respect to the thickness and permeability of both said barrier means and said medium to chlorine so that the chlorine generated at said second electrode is consumed at said first electrode without any substantial transfer of chlorine across the interface between said barrier means and said fluid.

10. The method of measuring the concentration of an electrochemically active species in a fluid comprising the steps of:
immersing in said fluid an electrode assembly including:
an electrolytic medium from which only said species is electrolytically generable,
barrier means selectively permeable to said species,
first electrode means of material electro-chemically inert to both said medium and said species and having surfaces in contact with said medium,
second electrode means of material electro-chemically inert to both said medium and said species, said second electrode means having surfaces in contact with said medium,
means for supporting said first and second electrode means to position their respective surfaces in contact with said medium in an interleaved side by side relationship with said surfaces equidistant from said barrier means and positioned so that the periodicity of the spacing of said electrode surfaces is sufficiently small with respect to the thickness and species permeability of both said barrier means and said medium so that the species generated at the surfaces of said second electrode is consumed at the adjacent surfaces of said first electrode without any substantial transfer of said species across the interface between said barrier means and said fluid, and
means connecting said first and second electrodes to a power source operable to bias said first and second electrodes at potentials to produce a current between said electrodes such that said species will be generated at said second electrode and consumed at said first electrode in quantity dependent upon the tendency of said species to establish an equilibrium condition across said barrier means between the respective concentrations of said species in said medium and said fluid; and
measuring said current flow as an indication of said species concentration in said fluid.

4,076,597
METHOD OF FORMING IRON FOIL AT HIGH CURRENT DENSITIES

Palliyil K. Subramanyan, Shaker Heights; Mieczyslaw Paul Makowski, Wickliffe, and Robert Joseph Setele, Eastlake, all of Ohio, assignors to Gould Inc., Rolling Meadows, Ill.

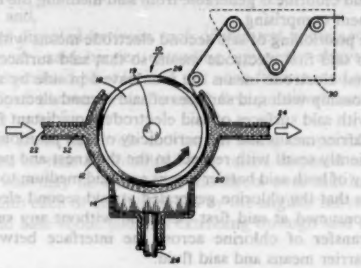
Filed Dec. 6, 1976, Ser. No. 747,719
Int. Cl.[2] C25D *1/04, 3/20*
U.S. Cl. 204—13 5 Claims

1. A method of electrolytically producing a sheet of iron foil on a rotating drum cathode comprising the steps of:
providing an iron containing anode spaced apart from a rotatably mounted drum cathode so as to form a gap between said cathode and said anode for containing elec-

trolyte, said anode being capable of forming iron ions which are soluble in said electrolyte;

flowing electrolyte between said cathode and said anode while maintaining the concentration of ferrous ion in said electrolyte within the range of from about 120 to less than about 162 grams per liter;

maintaining the pH of said electrolyte at a value ranging from about 3.3 to about 4.7 to prevent said ferrous ions from precipitating;



heating said electrolyte to a temperature in excess of ambient but below its boiling point;

rotating at least a portion of said cathode through said electrolyte;

passing direct electrical current between said cathode and anode at a cathode current density of at least about 800 amperes per square foot to cause iron to be deposited on said cathode; and

removing said so-formed iron foil from said cathode.

4,076,598

METHOD, ELECTROLYTE AND ADDITIVE FOR ELECTROPLATING A COBALT BRIGHTENED GOLD ALLOY

Lewis Brian Lerner, Linglestown, and Thomas Francis Davis, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 17, 1976, Ser. No. 742,955
Int. Cl.² C25D *3/62*
U.S. Cl. 204—43 G **13 Claims**

1. An aqueous bath for depositing from an electrolyzed solution thereof gold and, as an alloying additive to gold, variously closely controllable amounts of cobalt in an amount from 0.05 to 0.4 in percent by weight in the deposit based on amount of gold, said bath solution consisting essentially of:

1.0 – 4.0 troy oz/gal Au°, added as $KAu(CN)_2$;

50 – 150 g/l K_2HPO_4;

50 – 200 g/l KH_2PO_4;

5 – 60 g/l nitrilotriacetic acid; and

0.1 – 7.0 g/l Co°, as a soluble salt of cobalt, from at least one salt selected from the group consisting of cobalt sulfate, halide, nitrate and carbonate, said bath having a pH of 4.0 to 6.0.

3. A salt composition suitable for depositing gold and cobalt from an electrolyzed aqueous bath solution thereof, said composition consisting essentially of the salts as defined in claim 1, in the proportions thereof.

4,076,599

METHOD AND COMPOSITION FOR PLATING PALLADIUM

Jerome Joseph Caricchio, Jr., Binghamton, and Edward Robert York, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 627,493, Oct. 30, 1975, abandoned. This application Aug. 24, 1976, Ser. No. 717,419
Int. Cl.² C25D *3/50*
U.S. Cl. 204—47 **17 Claims**

14. An aqueous bath solution for the electro-plating of palladium consisting essentially of:

20–30 grams/liter of palladosamine chloride;

30–60 grams/liter of ammonium chloride;

30–40 grams/liter of ammonium sulfamate;

50–100 cc/liter of concentrated ammonium hydroxide so that said bath has a pH of about 8.5 to 9.6; and

1–1000 parts/million of a sulfite ion concentration derived from an alkali metal sulfite.

4,076,600

LEVELING AGENT FOR ACID ZINC ELECTROPLATING BATHS AND METHOD

Karen Huebner, Parma, Ohio, assignor to R. O. Hull & Company, Inc., Cleveland, Ohio

Filed Dec. 20, 1976, Ser. No. 752,079
Int. Cl.² C25D *3/22*
U.S. Cl. 204—55 R **66 Claims**

1. An aqueous acidic plating bath for the electrodeposition of a zinc coating on a substrate which comprises zinc ions, and an amount, sufficient to provide a level zinc electrodeposit, of one or more bath-soluble leveling phosphorus cations having the formula:

$$R_4P^{\oplus}$$

wherein each R is independently a hydroxy alkyl group.

50. An additive composition for an aqueous acidic zinc electroplating bath comprising a mixture of

a. one or more bath-soluble phosphorus cations having the formula

$$R_4P^{\oplus}$$

wherein each R is independently a hydroxy alkyl group, and

b. at least one thiourea having the formula

$$[R'_2N]_2CS$$

wherein each R' is independently hydrogen or an alkyl or alkenyl group.

4,076,601

ELECTROLYTIC PROCESS FOR THE PREPARATION OF ETHANE-1,1,2,2-TETRACARBOXYLATE ESTERS AND RELATED CYCLIC TETRACARBOXYLATE ESTERS

Donald A. White, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 22, 1976, Ser. No. 744,006
Int. Cl.² C25B *3/10*
U.S. Cl. 204—59 R **17 Claims**

1. An electrolytic process for the preparation of tetramethyl ethane-1,1,2,2-tetracarboxylate from dimethyl malonate, which process comprises subjecting a liquid electrolysis medium containing the dimethyl malonate, substantially anhydrous methanol, and iodide ion electrolyte to electrolysis at elevated temperatures sufficient to cause dehydrodimeric coupling of the dimethyl malonate at a current efficiency in excess of about 65 percent, using a graphite anode and a graphite cathode, and thereafter recovering the tetramethyl ethane-1,1,2,2-tetracarboxylate.

4,076,602

METHOD OF PRODUCING MAGNESIUM METAL AND CHLORINE FROM $MgCl_2$ CONTAINING BRINE

Roger M. Wheeler, 1957 E. 41, Tulsa, Okla. 74105

Filed Apr. 14, 1975, Ser. No. 567,512
Int. Cl.² C25C *3/04, 3/12, 3/08*
U.S. Cl. 204—70 **9 Claims**

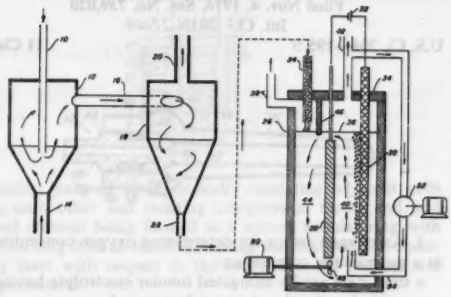
1. A method of producing magnesium metal and chlorine using $MgCl_2$ cell feed having hydrogen and oxygen impurities, comprising:

immersing spaced apart anode and cathode elements in a closed bath of molten electrolyte;

applying a voltage potential across the electrodes;

depositing the impure cell feed onto an area of the surface of the molten electrolyte, the impure cell feed being in the form of a powder of discrete porous particles in which the $MgCl_2$ content is at least 50%, the hydrogen contaminant content is less than 1%, the oxygen contaminant content is less than 13%, and the average porosity is greater than 30% at least a portion of the cell feed impurities being flash vaporized as the cell feed contacts the molten electrolyte;

withdrawing said impurities vaporized by contact of the impure cell feed with the surface of the molten electrolyte;



circulating the electrolyte upwardly in the inter-electrode space by the effect of gas produced therein, the electrolyte flowing up and out of the inter-electrode space towards the area where said cell feed is deposited;

circulating the electrolyte downwardly in the bath carrying said cell feed therewith into the lower portion of the inter-electrode space whereby at least a portion of the remaining impurities are chlorinated by chlorine gas generated at the anode element as the electrolyte rises in the inter-electrode space; and

withdrawing chlorine gas produced at the anode and molten magnesium produced at the cathode from the cell.

4,076,603

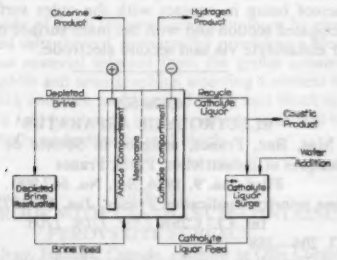
CAUSTIC AND CHLORINE PRODUCTION PROCESS

John N. Andersen, Moraga, CA, assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Apr. 7, 1977, Ser. No. 785,722

Int. Cl.² C25B 1/16, 1/26

U.S. Cl. 204—98 **5 Claims**



1. In the process of producing sodium hydroxide and chlorine by the stage-wise electrolysis of sodium chloride-containing brine, wherein in the first stage an electrolytic cell, consisting of anode and cathode compartments separated by at least one interposed buffer zone, is provided and wherein membranes separate the anode and cathode compartments from the buffer zone and brine is charged to the anode compartment and water is charged to both the buffer zone and to the cathode compartment and as a result of the electrolysis a concentrated sodium hydroxide solution of more than 250 g/l NaOH content is recovered from the cathode compartment and a dilute sodium hydroxide solution of 50–200 g/l NaOH content is recovered from the buffer zone; and the dilute sodium hydroxide solution is then charged to the cathode compartment of at least one second stage electrolysis cell consisting of membrane-separated anode and cathode compartments wherein charging of brine to the anode compartment and electrolysis of the same produces a concentrated sodium hydroxide solution of at least 250 g/l NaOH content in the cathode compartment of this second-stage cell; the improvement which comprises providing at least one first-stage electrolytic cell consisting of membrane-separated anode and cathode compartments without an intermediate buffer zone and wherein brine is charged to the anode compartment and electrolysis of the brine is conducted in a manner so as to produce in the cathode compartment a dilute sodium hydroxide solution containing about 10–25% by weight sodium hydroxide; charging the dilute sodium hydroxide solution to the cathode compartment of at least one second-stage electrolytic cell in lieu of water, introducing brine in the anode compartment of the second-stage cell, electrolyzing the brine and recovering from the cathode compartment of the second-stage cell a sodium hydroxide solution containing 25–50% by weight sodium hydroxide.

4,076,604

PROCESS FOR THE ELECTROLYTIC TREATMENT OF ALKALI HALIDE

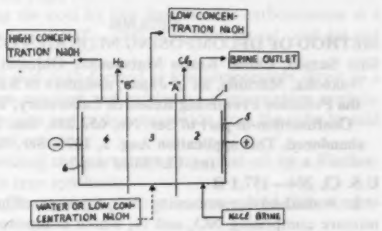
Naohiro Murayama; Kenichi Nakamura; Makoto Fukuda; Teruo Sakagami, and Shirou Suzuki, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1976, Ser. No. 732,095

Claims priority, application Japan, Oct. 13, 1975, 50-123078; Oct. 29, 1975, 50-130088

Int. Cl.² C25B 1/16, 1/26

U.S. Cl. 204—98 **6 Claims**



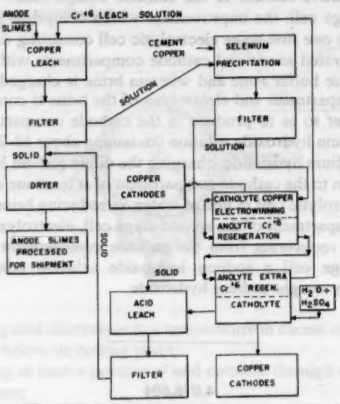
1. In a process for the electrolytic treatment of alkali halide in an electrolytic bath having an anodic chamber, an intermediate chamber and a cathodic chamber arranged in succession and separated from one another by an ion exchange membrane so as to provide low concentration caustic alkali solution from the intermediate chamber and high concentration caustic alkali solution from the cathodic chamber, the improvement comprising selecting said ion exchange membranes so that the membrane arranged between the anodic and intermediate chambers has a higher water penetration capability than that of the membrane arranged between the intermediate and cathodic chambers, the latter membrane having a water penetration capability of from about 1.3–4.0 g/A.h, and forming the high concentration caustic alkali solution in the cathodic chamber without the direct addition of any water to said cathodic chamber, said high concentration caustic alkali solution being produced exclusively from the metal ions and the water which have passed from said intermediate chamber through the ion exchange membrane into said cathodic chamber.

4,076,605

DICHROMATE LEACH OF COPPER ANODE SLIMES

Edward A. Bilson, Inspiration, Ariz., assignor to Inspiration Consolidated Copper Company, Morristown, N.J.

Filed Aug. 26, 1976, Ser. No. 717,910
Int. Cl.[2] C25C 1/12; C22B 7/00
U.S. Cl. 204—108 8 Claims



1. A process for the recovery of metal values from copper refinery anode slimes composed largely of copper, selenium, insolubles, and precious metals including silver comprising leaching the slimes with a solution containing from 20 to 200 g/l H_2SO_4 and from 2 to 25 g/l hexavalent chromium at a temperature not exceeding about 80° C., whereby copper dissolution is maximized and selenium and silver dissolution are minimized, separating the leach solution from the undissolved slimes residue, precipitating selenium from the separated leach solution by treatment with metallic copper, and electrowinning copper from the resulting purified solution.

4,076,606

METHOD OF DECOMPOSING NITROGEN OXIDE (NO_x)

Shin Suzuki, Chiba; Kazuo Matsumoto, Ohizumi, and Ichiro Nakaoka, Machida, all of Japan, assignors to Kabushiki Kaisha Pollution Preventing Research Laboratory, Tokyo, Japan

Continuation-in-part of Ser. No. 653,258, Jan. 20, 1976, abandoned. This application Aug. 2, 1976, Ser. No. 710,471
Int. Cl.[2] B01J 1/10
U.S. Cl. 204—157.1 R 12 Claims

1. A method for removing NO_x from an effluent gaseous mixture comprising NO_x and N_2 which comprises irradiating said gaseous mixture with microwave radiation at a gas pressure from about 1 to 14 mm Hg whereby the NO_x in said gaseous mixture is decomposed to nitrogen and oxygen.

4,076,607

PROCESS FOR COAL DESULFURIZATION

Peter D. Zavitsanos, 3018 Oak Drive, Norristown, Pa. 19403, and Kenneth W. Bleiler, 223 Crestview Road, Hatboro, Pa. 19040

Filed Dec. 22, 1975, Ser. No. 642,900
Int. Cl.[2] B10J 1/10; C10L 9/10
U.S. Cl. 204—162 R 8 Claims

1. A process for desulfurization of carbonaceous aggregates containing a relatively high percentage of sulfur, which comprises:

(a) crushing said aggregates to an average particle diameter of a size of about less than 5 centimeters;

(b) irradiating said aggregates with electromagnetic microwave energy for a duration to obtain an average temperature of said aggregates of no more than 150° C to induce chemical reactions to break bonds uniting gaseous elements and sulfur contained in said aggregates;

(c) liberating said sulfur from said aggregate upon forming gaseous compounds.

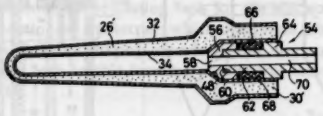
3. A process for desulfurization of carbonaceous aggregates as recited in claim 1 wherein said aggregate is coal.

4,076,608

OXYGEN SENSOR

Takeshi Fujishiro, and Toru Kita, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 4, 1976, Ser. No. 739,020
Int. Cl.[2] G01N 27/46
U.S. Cl. 204—195 S 11 Claims



1. An oxygen sensor for determining oxygen concentration in a gas mixture, comprising:

a solid-state axially elongated tubular electrolyte having an axial closed end and an axial open end;

first and second electrodes respectively covering the outer and inner surfaces of said electrolyte, said second electrode defining a generally hollow chamber near said open end;

means comprising a metallic holder for stationarily supporting said tubular electrolyte and said first and second electrodes, said holder being in electrical contact with said first electrode;

an electrically conducting annular head member tightly disposed in said chamber;

an electrically conducting elongated member including an elongated section of a diameter smaller than that of said chamber and a radially outwardly raised section of a diameter equal to that of said chamber, said elongated member being inserted into said chamber so that said elongated section to located between said annular head member and said raised section and said raised section is tightly engaged with said inner surface of said tubular electrolyte via said second electrode; and

a corrugated, cylindrical metallic member coaxially disposed around said elongated section, the corrugations thereof being in contact with the outer surface of said elongated section and with the inner surface of said tubular electrolyte via said second electrode.

4,076,609

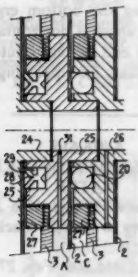
ELECTROLYSIS APPARATUS

Louis Mas, Buc, France, assignor to Societe de Recherches Techniques et Industrielles, Paris, France

Filed Jan. 9, 1976, Ser. No. 647,990
Claims priority, application France, Jan. 14, 1975, 75 00993
Int. Cl.[2] C25B 1/02, 1/04, 1/08
U.S. Cl. 204—258 13 Claims

1. An electrolysis apparatus formed by a stack of cells containing electrodes each of which is held in a pressure-resistant annular ring, the space between pairs of electrodes within said ring being separated into two compartments by a diaphragm, the said compartments being filled with electrolyte which generates the two gases produced by electrolysis in alternate ones of the compartments, the compartments having passing through them at least three ducts, at least one of which is an infeed duct for the electroyte and the two others are outlet ducts for a mixture of electrolyte and one or other of the gases, the ducts being in communication with respective compartments by means of passages which pass through the ducts, the

assembly of stacked rings being held between two end-plates and compressed by tie-rods; said apparatus comprising a first compression resisting and electrical isolating element cooperating with a second elastic sealing element to form a system separating each ring from adjoining rings, said first element being formed as a first annular ring and from a hard electrical



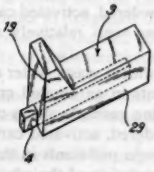
insulating material for electrically insulating adjacent cells from each other and resisting compression forces and said second element being formed as a second annular ring with said first ring from an elastic insulating material which is chemically inert with respect to the electrolyte for sealing said compartments.

4,076,610

CATHODE IN CELLS FOR PRODUCING ALUMINIUM BY ELECTROLYSIS OF SMELTED SALTS THEREOF

Cesare Bizzarri, Terni, Italy, assignor to Elettrocarbonium S.p.A., Milan, Italy

Filed Jul. 10, 1975, Ser. No. 594,703
Claims priority, application Italy, 25258/74
Int. Cl.² C25C *3/06, 7/02*
U.S. Cl. 204—290 R **7 Claims**



1. A cathode of a cell for producing aluminum by electrolysis of smelted salts thereof, prepared by providing a block of a carbonaceous material selected from the group consisting of carbon, graphite and semi-graphite, inserting a current bus-bar into said block and then molding and firing said block in direct contact with said bus-bar to form a cathode with said bus-bar at least partially embedded in said block.

4,076,611

ELECTRODE WITH LANTHANUM-CONTAINING PEROVSKITE SURFACE

Thomas J. Gray, Halifax, Canada, assignor to Olin Corporation, New Haven, Conn.

Filed Apr. 19, 1976, Ser. No. 677,875
Int. Cl.² C25B *11/06, 11/10, 1/34*
U.S. Cl. 204—290 F **11 Claims**

1. An electrode for the electrolysis of aqueous brine comprised of an electroconductive substrate and a perovskite surface of the emperical formula:

$$A\,A'\,B\,O_3 \qquad (I)$$

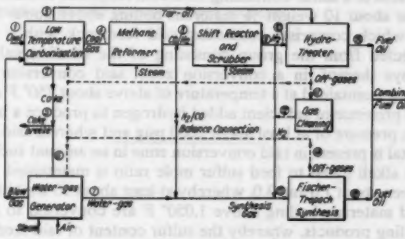
a. wherein A is lanthanum,
b. wherein A′ is an alkaline earth metal selected from the group consisting of calcium, strontium, barium, and mixtures thereof,
c. wherein B is a transition metal selected from the group consisting of cobalt, chromium, tungsten, molybdenum, manganese, iron, nickel, rhenium, uranium, and mixtures thereof,
d. wherein the atomic ratio of A:A′ is in the range from about 0.05:1 to about 0.95:1, and
e. wherein the valence of $A + A'\,B = 6$.

4,076,612

PROCESS FOR OBTAINING LIQUID FUEL-OIL AND/OR GASEOUS HYDROCARBONS FROM SOLID CARBONACEOUS FEED STOCKS

John William Hollaway, Eiffel Flats, Rhodesia, assignor to Rio Tinto (Rhodesia) Limited, Salisbury, Rhodesia

Filed Dec. 9, 1974, Ser. No. 530,557
Claims priority, application Rhodesia, Dec. 7, 1973, 475; May 22, 1974, 201
Int. Cl.² C10G *1/02;* **C07C** *27/00*
U.S. Cl. 208—8 **10 Claims**



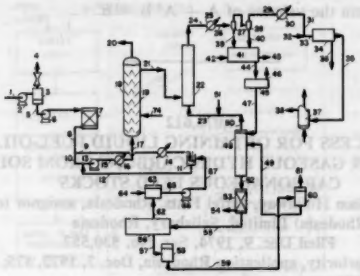
1. In a process of obtaining hydrocarbon fuel-oils from coal, comprising the steps of:
(a) treating the coal by low temperature carbonization at a temperature of 500° – 1000° C to form tar-oil, coal-gas and coke;
(b) passing said coke formed at low temperature direct to a water-gas reaction and producing a gas mixture containing hydrogen and carbon monoxide from the coke by said water-gas reaction;
(c) synthesizing the gas mixture into fuel-oil by a Fischer-Tropsch type synthesis;
(d) treating the coal-gas to form hydrogen and carbon monoxide;
(e) generating a hydrogen stream from the gas produced in step (d) by passing the hydrogen and carbon monoxide through a a water-gas shift reactor and a carbon dioxide scrubber.
(f) adding part of the gas from step (e) to step (c); and
(g) hydrogenating the tar-oil with the remainder of the gas from step (e);
the improvement comprising
(h) adding part of the gas produced in one of steps (b) and (d) to the gas produced in the order of steps (b) and (d), the addition being in the direction (b) to (e) when the amount of hydrogen that would otherwise arrive in (c) is less than twice the amount of carbon monoxide and in the direction (d) to (c) when the amount of hydrogen that would otherwise arrive in (c) is more than twice the amount of carbon monoxide, thereby to make maximum use of the hydrogen contained in the coal and consequently minimize carbon loss due to the water-gas shift reaction occurring in (b) and (e), and to maintain a 2:1 ratio of hydrogen to carbon monoxide in (c).

4,076,613

COMBINED DISULFURIZATION AND CONVERSION WITH ALKALI METALS

Roby Bearden, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Apr. 28, 1975, Ser. No. 571,903
Int. Cl.[2] C10G 13/06; B01J 27/04
U.S. Cl. 208—108 18 Claims



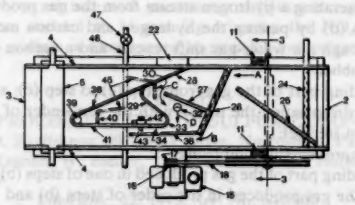
7. A process for the combined desulfurization and hydroconversion of a sulfur-containing residuum feedstock containing at least about 10 weight % materials boiling above about 1,050° F, which comprises contacting said feedstock with a metal selected from the group consisting of the alkali metals and alloys thereof, in a conversion zone, said conversion zone being maintained at a temperature of above about 750° F and in the presence of sufficient added hydrogen to produce a hydrogen pressure of at least about 2000 psig and wherein said alkali metal is present in said conversion zone in an amount such that the alkali metal to feed sulfur mole ratio is maintained at between about 1.0 and 3.0, whereby at least about 50 weight % of said materials boiling above 1,050° F are converted to lower boiling products, whereby the sulfur content of said feedstock is reduced by at least about 50 weight % and further wherein said alkali metal is at least partially converted to alkali metal sulfide in said conversion zone.

4,076,614

INCLINED, VIBRATED, SIFTER AND STRATIFIER WITH GATES

Edmond F. Todd, Suite 202-Block 8, Regency Court, Grande Prairie, Canada

Filed Mar. 1, 1976, Ser. No. 663,126
Claims priority, application Canada, Sep. 13, 1974, 209221
Int. Cl.[2] B03B 7/00
U.S. Cl. 209—13 4 Claims



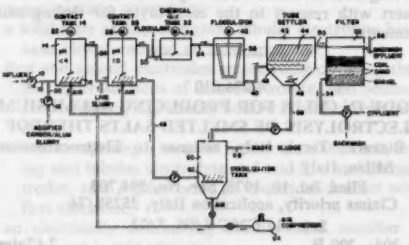
1. An apparatus for separating heavy metal values from granular material comprising an inclined chute having an open bottom end; hopper means in the top end of the chute for receiving granular material; dispensing means above the hopper for dispensing liquid into the hopper; a screen in and normal to the chute and adjacent and downstream of said hopper for receiving coarse portions of said granular material; a first trough downstream of said screen for receiving fines from said granular material; means for flushing light material from said first trough; normally closed gate means in said first trough; a second trough for receiving heavy particulate material from said first trough when the gate means is opened; means for flushing any remaining light material from said second trough; a discharge opening in the bottom of said second trough for discharging heavy metal values remaining in the second trough after flushing of light material therefrom; a shaft pivotally supporting the bottom end of the chute for oscillation of said chute about a horizontal axis; an eccentric shaft supporting the top end of said chute; and drive means rotating said eccentric shaft for imparting said oscillation to said chute.

4,076,615

PROCESS AND SYSTEM FOR TREATING WASTE WATER

Douglas E. Olesen, Kennewick, and Alan J. Shuckrow, Pasco, both of Wash., assignors to Battelle Pacific N. W. Laboratories, Richland, Wash.

Continuation of Ser. No. 446,308, Feb. 27, 1974, abandoned.
This application Oct. 6, 1975, Ser. No. 619,628
Int. Cl.[2] C02C 5/04
U.S. Cl. 210—5 7 Claims



1. An improved process for the removal and degradation of dissolved organic pollutants in waste water containing such using a combined powdered, activated carbon/aerated biological treatment process with relatively short retention time, comprising:

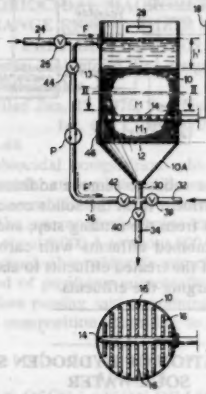
1. contacting an influent waste water stream containing the organic pollutants in an aerated contact vessel with an oxygen-containing gas and a slurry containing an acidified mixture of powdered, activated carbon and alum for adsorption of organic pollutants in the waste water on the carbon and coagulation of the adsorbed carbon particles by the alum, the activated carbon and alum added in amounts to the influent waste water stream to give at least 50 mg/l carbon and 100 mg/l alum,
2. adjusting to the pH of the treated influent waste water stream to cause precipitation of the alum as aluminum hydroxide,
3. adding a polyelectrolyte flocculant to the treated influent waste water stream as an aid in effecting solid-liquid separation,
4. effecting solid-liquid separation into sludge and a supernatant,
5. aerating the sludge by discharge of an oxygen-containing gas therethrough for metabolism of the adsorbed organics therein,
6. thermally regenerating a portion of the sludge to oxidize the organics absorbed on the carbon contained in the sludge for reactivation of the carbon and to convert aluminum hydroxide contained in the sludge to alumina,
7. recycling a part of the aerated sludge to the aerated contact basin for contact with the influent waste water stream,
8. acidifying another part of the thermally regenerated sludge with sulfuric acid to convert the alumina therein to alum, and

9. recycling the acidified and thermally regenerated sludge portion containing reactivated carbon and alum for contact with the incoming influent wste water stream.

4,076,616
PROCESS FOR THE BIOLOGICAL PURIFICATION OF SEWAGE

Luigi Verde, via S. Maria Mazzarello, 30/9, Turin, Italy

Filed Jun. 11, 1976, Ser. No. 695,297
Claims priority, application Italy, Jun. 12, 1975, 68517/75
Int. Cl.² C02C *1/02*
U.S. Cl. 210—17 **6 Claims**



1. A process for the biological purification of sewage by percolation through a submerged fixed bed of activated carbon under aerobic conditions, wherein:

(a) the particle size of the bed of activated carbon is between 1.5 and 8mm;

(b) oxygenation air is blown into the carbon bed at an intermediate level, in order to oxygenate directly only the mass of carbon disposed above the said intermediate level;

(c) the linear velocity of the water through the bed does not exceed 2 m/hour;

(d) the water remains in contact with the mass of carbon above the intermediate level for a time of contact of at least 30 minutes;

(e) the said intermediate level is such that, under the said operating conditions, a lower layer of the mass of carbon below the said intermediate level is substantially free of active colonies of bacteria.

4,076,617
SONIC CAVITATION AND OZONATION OF WASTE MATERIAL

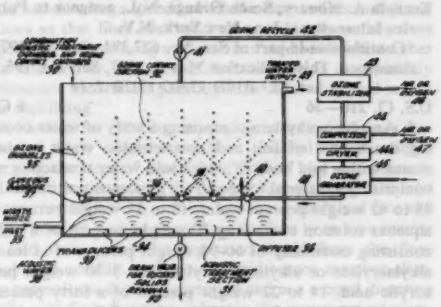
David Bybel, N. Bellmore; Richard F. Furey, Brentwood, and Donald P. Stahl, N. Bellmore, all of N.Y., assignors to TII Corporation, Lindenhurst, N.Y.

Continuation of Ser. No. 575,505, May 8, 1975, abandoned, which is a continuation of Ser. No. 470,452, May 16, 1974, abandoned, which is a continuation of Ser. No. 384,242, July 31, 1973, abandoned, which is a continuation of Ser. No. 136,404, April 22, 1971, abandoned. This application Jan. 17, 1977, Ser. No. 760,005
Int. Cl.² C02B *1/78, 1/38, 3/08*
U.S. Cl. 210—19 **18 Claims**

1. A process for combined acoustic treatment and ozonation of liquid waste material, comprising the steps of, placing the waste material in a vessel,

providing the vessel with diffusers that emit gaseous bubbles thereinto, said diffuser causing said bubbles to cover at least 90 percent of the cross-sectional area of the vessel so as to divide the vessel by a gaseous barrier into a generally lower acoustic treatment section with a generally upper ozone contact section,

initially placing said waste material into the acoustic treatment section, imparting acoustic energy to said material in



said section at an energy level sufficient to cavitate and to emulsify said waste material,

transferring said cavitated liquid to said ozone contact section, and diffusing a gas stream containing 0.5 to 10% ozone into said ozone contact section.

4,076,618
TREATMENT OF LIQUIDS CONTAINING COMPLEXED HEAVY METALS AND COMPLEXING AGENTS

Rudolph J. Zeblisky, Hauppauge, N.Y., assignor to Photocircuits Division of Kollmorgen Corporation, Glen Cove, N.Y.

Filed Jul. 9, 1976, Ser. No. 703,969
Int. Cl.² B01D *15/04, 15/06*
U.S. Cl. 210—30 R **34 Claims**

14. A method of separating alkali metal salt by-products of an electroless copper deposition bath from an alkanolamine complexing agent and a complex species of copper complexed with an alkanolamine complexing agent in an alkaline electroless copper deposition bath, said method comprising:

a. lowering the pH of said alkaline bath or alkaline effluent thereof to less than 11, to render said alkanolamine-complexed copper and said alkanolamine complexing agent extractable by an ion exchange medium;

b. contacting the pH-adjusted bath liquid of step (a) with an ion exchange medium capable of extracting said alkanolamine-complexed copper and said alkanolamine complexing agent from the pH-adjusted bath liquid, said ion exchange medium being selected from the group consisting of cation exchange resins and chelating exchange resins;

c. removing from said exchange medium a bath liquid comprises alkali metal salt by-products and which is substantially free of said alkanolamine-complexed copper and said alkanolamine complexing agent;

d. removing said alkanolamine-complexed copper and said alkanolamine complexing agent from the exchange medium, and

e. returning said alkanolamine-complexed copper and said alkanolamine complexing agent to an alkaline electroless metal deposition bath.

4,076,619
HYDROPHILIC ACRYLIC POLYMERS AS MARINE FILTERS, ALGAE GROWTH CATALYSTS, AND BREEDING STIMULUS FOR FISH AND INVERTEBRATES

Kenneth A. Howery, South Orange, N.J., assignor to Polymetrics International Inc., New York, N.Y.

Continuation-in-part of Ser. No. 627,384, Oct. 30, 1975, abandoned. This application May 9, 1977, Ser. No. 795,193
Int. Cl.[2] B10D *15/00*; C02B *1/14*
U.S. Cl. 210—36 **6 Claims**

1. An aqueous system comprising a body of water constituting the habitat of fish and invertebrates, water contacting means within said body of water, said water contacting means comprising a material formed from a composition consisting of 48 to 62 weight percent water; 10 to 18 weight percent of an aqueous solution containing 70 weight percent of a polymer consisting essentially of 60–95 weight percent of at least one alkylacrylate or alkylmethacrylate and 5–40 weight percent acrylic acid; 14 to 22 weight percent of a forty percent by weight solids, prepolymer solution; 2.5 to 7.2 weight percent of a 3 percent by volume ammonia solution; and 3.5 to 7.2 weight percent of an epoxy resin; said contacting means functioning to selectively absorb toxic marine life waste materials from said body of water.

3. A water contacting material for improving the fish and invertebrate life maintaining chemical balance within a body of water constituting the habitat of fish and invertebrates, said material being formed from a composition consisting of 48 to 62 weight percent water; 10 to 18 weight percent of an aqueous solution containing 70 weight percent of a polymer consisting essentially of 60–95 weight percent of at least one alkylacrylate or alkylmethacrylate and 5–40 weight percent acrylic acid; 14 to 22 weight percent of 40 percent by weight solids, prepolymer solution; 2.5 to 7.2 weight percent of a 3 percent by volume ammonia solution; and 3.5 to weight 7.2 percent of an epoxy resin; said contacting material functioning to selectively absorb toxic marine life waste materials from said body of water.

5. The process for improving the fish and invertebrate life sustaining chemical balance within a body of water constituting the habitat of fish and invertebrates, said process comprising the step of contacting said water with a material formed from a composition consisting of 48 to 62 weight percent water; 10 to 18 weight percent of an aqueous solution containing 70 weight percent of a polymer consisting essentially of 60–95 weight percent of at least one alkylacrylate or alkylmethacrylate and 5–40 weight percent acrylic acid; fourteen to twenty-two weight percent of a forty percent solids, prepolymer solution; 2.5 to 7.2 weight percent of an epoxy resin; said material functioning to selectively absorb toxic marine life waste materials from said body of water.

4,076,620
PROCESS FOR THE DISPOSAL OF SEWAGE

Robert E. Opferkuch, Jr., Kettering, Ohio, and George M. Wong-Chong, Ithaca, N.Y., assignors to Monsanto Research Corporation, St. Louis, Mo.

Continuation of Ser. No. 200,827, Nov. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 103,658, Jan. 4, 1971, abandoned. This application Oct. 15, 1973, Ser. No. 406,725
Int. Cl.[2] C02C *1/40*
U.S. Cl. 210—45 **4 Claims**

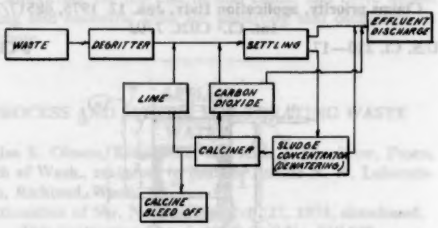
1. A high rate process for treating sanitary sewage which comprises the steps of:

a. removing from the raw sewage objects injurious to equipment in subsequent steps;

b. adding sufficient lime to the raw sewage to exceed a 1:1 weight ratio of lime to the chemical oxygen demand, but not less than 500 parts per million lime, the amount of lime being sufficient to permit the sewage to be treated including carbonation in step (C) and separation of step (d) is not more than 30 minutes with the separated effluent having a Jackson Turbidity of less than 50;

c. immediately treating the limed sewage with carbon dioxide to reduce the pH of the sewage to about 10.6 to about 11.2;

d. permitting the solids in the carbonated, limed sewage to settle and separating the solids and liquid effluent in not more than 30 minutes from lime treatment in step (b);



e. concentrating the solids to remove additional fluids;

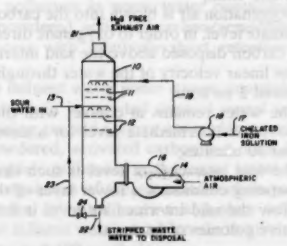
f. combining the effluent from the solids concentration step with the effluent from the settling step; and

g. treating the combined effluents with carbon dioxide to reduce the pH of the treated effluents to about 6 to 8, and thereafter discharging the effluents.

4,076,621
CHELATE OXIDATION OF HYDROGEN SULFIDE IN SOUR WATER

Leslie C. Hardison, Barrington, Ill., assignor to Air Resources, Inc., Palatine, Ill.

Filed Mar. 15, 1976, Ser. No. 667,111
Int. Cl.[2] C02B *1/18*
U.S. Cl. 210—60 **9 Claims**



1. A process for treating sour water to remove hydrogen sulfide therefrom, which comprises:

introducing sour water into an intermediate portion of a treating tower between upper and lower contact zones thereof, and passing the sour water downwardly through said lower contact zone;

introducing air into the lower portion of said tower and passing the air upwardly through said lower contact zone countercurrently to said sour water, thereby stripping hydrogen sulfide gas from said sour water;

introducing an aqueous chelated iron solution into said tower above said upper contact zone, and passing said solution downwardly through said upper contact zone;

passing the evolved gas containing hydrogen sulfide and air from said lower contact zone upwardly through said upper contact zone countercurrently to said solution, whereby said solution removes hydrogen sulfide from the gas and oxidizes it to sulfur;

discharging the treated gas from the upper portion of said tower;

passing said solution downwardly from said upper contact

zone through said lower contact zone wherein said solution mixes with the sour water introduced thereto and whereby said solution oxidizes residual dissolved hydrogen sulfide in said sour water to sulfur;

said air passing upwardly through said lower contact zone and through said upper contact zone functioning to oxidize said chelated iron solution and maintain its activity; and

withdrawing from the lower portion of said tower an aqueous stream comprising the treated sour water, said chelated iron solution, and sulfur solids.

4,076,622
MICROBIOCIDAL MACRORETICULAR ION EXCHANGE RESINS, THEIR METHOD OF PREPARATION AND USE

C. Richard Costin, Jenkintown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Jun. 22, 1976, Ser. No. 698,626
Int. Cl.[2] C02B *3/10*
U.S. Cl. 210—64 **9 Claims**

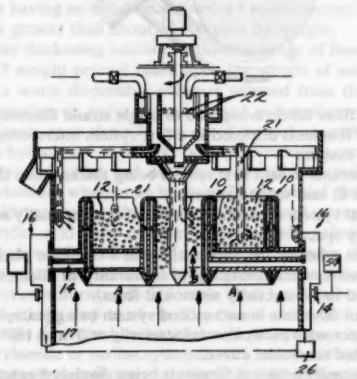
1. A microbiocidal composition which comprises a large pore macroreticular strong base anion exchange resin containing quaternary ammonium groups, wherein the average critical dimension of the macroreticular anion exchange pore is in the range of from about 8,000 A to about 500,000 A which contains a physically bound silver chloride microbiocide.

2. A method of purifying microbially contaminated water which comprises passing said contaminated water through a microbiocidal composition according to claim 1.

4,076,623
CONTINUOUS OSCILLATION OF LIQUID SEPARATOR

Stefan Golston, Bellevue, Ohio, assignor to Kamyr, Inc., Glens Falls, N.Y.

Filed Dec. 7, 1976, Ser. No. 748,286
Int. Cl.[2] B01D *33/00*
U.S. Cl. 210—77 **11 Claims**



1. Apparatus for effecting separation of a liquid from a suspension of finely comminuted fiber material and the liquid, which suspension is flowing in a first direction, including at least one non-rotatable screen member having an apertured face thereof disposed in the flow of suspended fiber material and having a conduit leading away from said face to an area remote from said flow to remove separated liquid from the flow, and apparatus for moving the screen member with respect to the flowing suspension both generally in the first direction and in a second direction opposite the first direction, wherein the improvement comprises

said apparatus for moving said screen member comprising oscillating means for continuously oscillating the screen member said oscillating means further comprising frequency inducing means which functions to produce a frequency below the natural frequency of said apparatus, and amplitude inducing means which functions to produce an amplitude larger than the apertures in the face of said screen member; from a middle position with substantially the same average speed in both the first and second directions so that fiber mat build-up on said screen face does not take place during movement of said screen face either in said first or said second directions, so as to essentially eliminate backflushing through said face while said screen is oscillating.

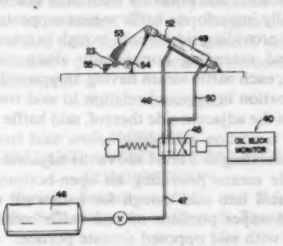
7. A method for effecting separation of a liquid from a suspension of finely comminuted fiber material and the liquid comprising the steps of establishing flow of said suspension in a first direction, contacting the flowing suspension with at least one non-rotatable screen member having an apertured face and having a conduit leading away from the face to an area remote from said flow, removing separated liquid from the flow through said conduit, and moving said screen member alternately generally in said first direction and in a second direction opposite said first direction, wherein the improvement comprises

effecting said screen-moving step by continuously oscillating said screen member with an oscillating means; the oscillating means comprising frequency inducing means which functions to vibrate at least said screen member at a frequency below the natural frequency of said screen member, and amplitude inducing means which functions to produce an amplitude larger than the apertures in the face of said screen member; from a middle position with substantially the same average speed in both the first and second directions so that fiber mat build-up on said screen face does not take place during movement of said screen face either in said first or said second directions, so as to essentially eliminate backflushing through said face while said screen is oscillating.

4,076,624
SELF-DEPLOYING BOOM

Peter John Tolan, Scituate, Mass., assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Jan. 28, 1977, Ser. No. 763,400
Int. Cl.[2] E02B *15/04*
U.S. Cl. 210—96 R **8 Claims**



1. An apparatus for controlling a spill of liquid pollutant on a body of water having a current, comprising: a flexible elongated longitudinally extending flotatable boom, said boom having a pair of spaced ends, a tow line having a pair of ends, one end of said towline secured to one portion of said boom intermediate the ends thereof to fold said boom into a pair of parallel elongated portions by the current retaining means located upstream of said boom, the other end of said tow line secured to said retaining means to secure said boom in said folded condition, a pair of spaced mooring blocks located in said body of water, one of said ends of said boom being secured to one of said mooring blocks by a mooring line, the other one of said ends of said boom being secured to the other one of said mooring blocks, sensing means mounted on said retaining means operative to monitor for a liquid pollutant in such cur-

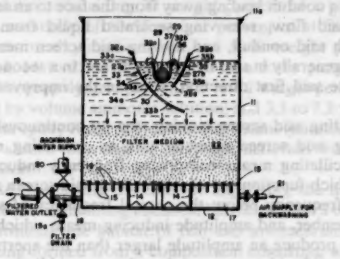
rent and provide an output signal in response to pollutant in said current, and cutting means mounted on said retaining means operative to sever said tow line in response to said signal from said sensing means to deploy said flexible extending flotatable boom.

4,076,625

BAFFLE AND WASH TROUGH ASSEMBLY FOR GRANULAR-MEDIA FILTERS

John James Scholten, and James Clinton Young, both of Ames, Iowa, assignors to General Filter Company, Ames, Iowa

Filed Jan. 16, 1976, Ser. No. 649,902
Int. Cl.² B01D *23/24*
U.S. Cl. 210—274 **14 Claims**



1. Water filtration apparatus of the kind providing a vertically-extending tank having a filter medium bed of granular filtering material supported in the lower portion thereof, and means for washing said bed, said washing means including means for passing water upwardly through said bed and additional means for increasing the agitation of said filter material while said wash water is passed therethrough, wherein the improvement comprises at least one baffle and wash trough assembly for reducing filtering material loss during washing, comprising:

a. a wash water collection trough supported in said tank to extend horizontally across the upper portion thereof, said trough having upwardly-extending side portions and an upper edge on at least one side thereof functioning as an overflow weir, the lower portion of said trough converging downwardly and inwardly from each side thereof; and

b. substantially imperforate baffle means supported adjacent each weir-providing side of said trough in spaced relation thereto and extending horizontally along the adjacent weir edge, each baffle means having an upwardly concave arcuate portion in opposed relation to said trough lower portion on the adjacent side thereof, said baffle means also including a portion extending below said trough and a portion extending to a level above the adjacent weir edge, each baffle means providing an open-bottom restricted flow channel into said trough for backwash water, said lower and upper portions of said baffle means merging smoothly with said opposed arcuate portion.

4,076,626

HIGH STRENGTH CAST MODULES FOR SUPPORTING REVERSE OSMOSIS MEMBRANES

Joseph F. Meier, Export, and James D. B. Smith, Wilkins Township, Allegheny County, both of Pa., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,357
Int. Cl.² B01D *31/00*
U.S. Cl. 210—496 **10 Claims**

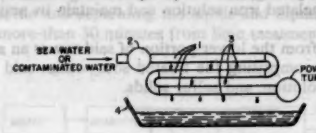
7. A rigid, hollow, porous, strongly consolidated reverse osmosis membrane support module having a wall containing bonded, resin coated filler, wherein the resin is the cured reaction product of a 100% solids, solventless, latent catalyzed epoxy resin composition consisting essentially of:

1. one part of liquid epoxy resin,

2. from about 0.75 to about 1.55 parts of liquid organic acid anhydride curing agent,

3. from about 0.25 to about 0.95 part of liquid diepoxide reactive diluent, and

4. from about 0.0001 to about 0.0025 part of a latent catalyst selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts and quaternary arsonium salts,



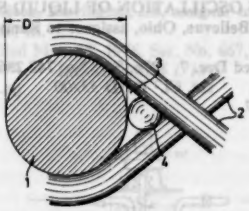
wherein the resin constitutes from about 1 to about 18 percent of the resin coated filler weight, the filler comprises particles having a granular structure and an average particle size between about 40 microns and about 500 microns, the inside of said wall supporting a reverse osmosis membrane.

4,076,627

MESH WEAVE FILTER

Dieter Friedrichs, 47 Eichendorffstrasse, Neu-Ehrenfeld, Germany

Filed Nov. 10, 1975, Ser. No. 630,238
Claims priority, application Germany, Nov. 16, 1974, 2454390; Jul. 12, 1975, 2531222
Int. Cl.² B01D *39/10*
U.S. Cl. 210—499 **8 Claims**



1. In a filter fabric composed of single strand filaments consisting of filaments disposed in a first system intersecting with a second system,

the filaments in said first system being thicker than the filament in said second system,

said first system consisting of a plurality of mutually equidistantly spaced filaments,

the axes whereof lies substantially in a common plane, said second system consisting of a plurality of filaments disposed in substantially sinusoidal form,

adjacent filaments in said second system being juxtaposed in contact with each other substantially at 0° and 180° points on said sinusoidal curve,

said mutually adjacent filaments being displaced exactly out of phase to provide interstices of equal cross-sectional area and shape therebetween,

said second system interacting with said first system in a manner that the filaments of said first system are embraced in the interstices formed between the filaments of said second system,

the apertures in said filter fabric having substantially triangular cross-section, the sides of said triangle being defined by the inner edges of any predetermined adjacent pair of thinner filaments and the corresponding thicker filament embraced in the interstices therebetween, said thinner filaments being designated as having a diameter *d*, said thicker filaments being designated as having a diameter D and the pitch between the axes of said thicker filaments being designated as *t*, the filter gauge of said filter fabric

being defined as the diameter of the sphere to which all the edges of said triangular aperture formed by said two thinner and one thicker filaments are tangential, the diameter of said sphere being designated as μ, the improvement which comprises

providing the maximum distance between the mutually facing surfaces of any predetermined pair of adjacent mutually contacted, out of phase, thinner filaments of said second system, between which a thicker filament of said first system is disposed, designated as H, is greater than the cross-sectional width, designated as B, of said thicker filament measured in the common plane of axes of said first system of thicker filaments,

providing the filaments in such a relationship that d is between 0.7 μ and 1.2 μ, and 1.2 μ, and the relationship between the pitch-spacing of the thicker filaments t to the diameter of the thicker filaments D corresponds to the following Table:

Where D is:	then t is:
2 to 2.5 times μ	7.15 to 6.8 times μ
2.5 to 3 times μ	6.8 to 7.1 times μ
3 to 3.5 times μ	7.1 to 7.35 times μ
3.5 to 4 times μ	7.35 to 7.7 times μ.

4,076,628

DRILLING FLUID COMPOSITIONS AND METHODS OF PREPARING SAME

Richard L. Clampitt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 372,825, June 22, 1973, Pat. No. 3,921,733, which is a continuation-in-part of Ser. No. 224,914, Feb. 9, 1972, abandoned. This application Oct. 8, 1975, Ser. No. 620,728

The portion of the term of this patent subsequent to Sep. 30, 1992, has been disclaimed.

Int. Cl.² C09K *7/02*

U.S. Cl. 252—8.5 C **22 Claims**

1. A water-base drilling fluid useful in drilling a well, comprising:

water having an initial total dissolved solids content which is not greater than about 40,000 ppm by weight;

a water thickening amount, within the range of from 0.0025 to 5 weight percent based upon the weight of said water, of a water dispersible polymer selected from the group consisting of: polyacrylamides and polymethacrylamides wherein up to about 75 percent of the carboxamide groups are hydrolyzed to carboxyl groups; previously crosslinked polyacrylamides and previously crosslinked polymethacrylamides wherein up to about 75 percent of the carboxamide groups are hydrolyzed to carboxyl groups; polyacrylic acid and polymethacrylic acid; polyacrylates; polymers of N-substituted acrylamides wherein the nitrogen atoms in the carboxamide groups have from 1 to 2 alkyl substituents which contain from 1 to 4 carbon atoms, and wherein up to about 75 percent of the carboxamide groups are hydrolyzed to carboxyl groups; copolymers of acrylamide or methacrylamide with another ethylenically unsaturated monomer copolymerizable therewith, sufficient acrylamide or methacrylamide being present in the monomer mixture to impart said water-dispersible properties to the resulting copolymer when it is mixed with water, and wherein up to about 75 percent of the carboxamide groups are hydrolyzed to carboxyl groups; and mixtures of said polymers;

an amount, within the range of from 0.05 to 60 weight percent based upon the weight of said polymer, of a water-soluble compound of chromium selected from the group consisting of ammonium chromate, ammonium dichromate, the alkali metal chromates and dichromates, chromium trioxide, and mixtures thereof, wherein the chromium present is capable of being reduced from +6 valence to +3 valence, and which amount is sufficient to cause gelation of said water containing said polymer when the valence of at least a portion of said chromium is reduced to said lower valence state;

an amount of a water-soluble reducing agent selected from the group consisting of hydroquinone, sodium sulfide, sodium hydrosulfite, sodium metabisulfite, potassium sulfite, sodium bisulfite, potassium hydrosulfrite, potassium metabisulfite, sodium sulfite, sodium thiosulfate, ferrous sulfate, hydrogen sulfide, ferrous chloride, p-hydrazinobenzoic acid, hydrazine phosphite, hydrazine dihydrochloride, thioacetamide, and mixtures thereof, and which is effective to reduce at least a portion of said chromium to said lower valence state and cause said gelation, said amount being within the range of from 0.1 to about 200 percent of the stoichiometric amount required to reduce said chromium to said lower valence state; and

sufficient suspended finely divided solids to form a filter cake on the wall of said well.

4,076,629

SOLVENT SOLUBLE WARP SIZE

Gerald P. Beaumont, and William C. Jones, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 28, 1976, Ser. No. 691,130

Int. Cl.² D06M *15/26, 15/32;* **C08F** *112/08, 114/02*

U.S. Cl. 252—8.6 **10 Claims**

1. In a resin composition for sizing textile yarns, the improvement wherein said resin composition is a mixture of a chlorinated polyolefin having a crystallinity of less than about 10 percent and about 10–50 percent based on the weight of chlorinated polyolefin of an aromatic hydrocarbon polymer having an average molecular weight of at least about 100,000.

4,076,630

EMULSIFIERS FOR DURABLE FLAME RETARDANT TEXTILE FINISHES

Ray E. Smith, Ann Arbor, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Aug. 5, 1976, Ser. No. 711,771

Int. Cl.² B27K *3/00*

U.S. Cl. 252—8.1 **45 Claims**

1. An aqueous tris-haloaliphatic phosphate emulsion concentrate wherein the emulsifier for said phosphate is a water soluble mono- or bis-haloalkyl ester of phosphoric acid, a water soluble salt of said acid and mixtures thereof, said water comprising from about 1 percent to about 40 percent by weight of the total concentrate.

4,076,631

ANTISOILING AND ANTISTATIC TEXTILE TREATING COMPOSITION

Michael G. Caruso, Jamestown, N.C., and Réne A. Eckert, Simpsonville, S.C., assignors to Chas. S. Tanner Co., Greenville, S.C.

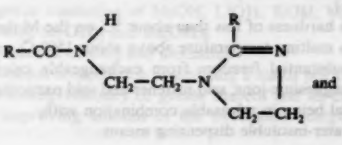
Filed Jun. 14, 1976, Ser. No. 692,687

Int. Cl.² D06M *13/34*

U.S. Cl. 252—8.8 **5 Claims**

1. A textile treating composition adapted to provide a relatively permanent antistatic and dirt repellent finish and consisting essentially of a nonionic surfactant-containing aqueous dispersion of:

1. about 10% to about 20% of an antistatic agent comprising a mixture of



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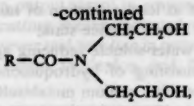


R being alkyl of 14 to 20 carbon atoms in both formulas

2. about 3% to about 35% of an aqueous dispersion of hard particles having a weight average particle diameter of from about 0.05 micron to about 1 micron;
3. about 1% to about 6% of a fluorine-free inorganic or organic monobasic or polybasic acid;
4. 0% to about 5% of an antimicrobic agent; and
5. about 1% to about 35% of a fluorocarbon agent which provides a low free energy surface, said fluorocarbon being a polymer containing the $—CF_3$ group.

4,076,632

FABRIC SOFTENER

James E. Davis, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 22, 1977, Ser. No. 770,487
Int. Cl.[2] D06M *13/34, 13/40, 13/46*
U.S. Cl. 252—8.8 **13 Claims**

1. A liquid fabric conditioning composition comprising:

(a) from about 3% to about 12% by weight of the composition of cationic fabric conditioning agents;

(b) from about 0.2% to about 1.3% by weight of the composition of protonated di-polyethoxy monoalkyl amine;

(c) from about 1% to about 6% by weight of the composition of urea; and

(d) water; wherein the weight ratio of urea to protonated di-polyethoxy monoalkyl amine is from about 18:1 to about 3:1.

4,076,633

FABRIC TREATING ARTICLES WITH IMPROVED CONDITIONING PROPERTIES

James B. Edwards, Cincinnati, and Francis L. Diehl, Wyoming, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 18, 1974, Ser. No. 516,051
Int. Cl.[2] D06M *13/46, 15/04, 15/22, 15/24*
U.S. Cl. 252—8.75 **13 Claims**

1. An article adapted for concurrently softening and conditioning fabrics in an automatic clothes dryer wherein a softener and a water-insoluble particulate material are transferred to fabrics thereby giving the fabrics softening, anti-wrinkling and ease-of-ironing benefits, comprising:

a. a softening amount of a fabric softener characterized by a melting point above about 38° C;

b. a fabric conditioning amount of a substantially water-insoluble particulate material characterized by:

i. an average particle size of from about 1.0 μm to about 50 μm;

ii. a shape having an anisotropy of from about 5:1 to about 1:1;

iii. a hardness of less than about 5.5 on the Mohs scale;

iv. a melting temperature above about 150° C; and

v. substantial freedom from exchangeable calcium and magnesium ions; said softener and said particulate material being in releasable combination with;

c. a water-insoluble dispensing means.

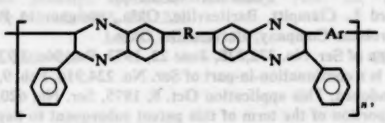
4,076,634

COMPOSITION FOR ANTIFRICTION MATERIAL

Vasily Vladimirovich Korshak, ulitsa Gubkina, 4, kv. 81; Irina Alexandrovna Gribova, ulitsa Vavilova, 12, kv. 31; Alexandr Petrovich Krasnov, prospekt Kalinina, 31, kv. 28; Evgenia Semenovna Krongauz, Leningradsky prospekt, 26, kv. 60; Alla Markovna Berlin, ulitsa Obrucheva, 3, korpus 4, kv. 67; Olga Vladimirovna Vinogradova, 5 Parkovaya ulitsa, 56, korpus 6, kv. 35; Georgy Viktorovich Mamatsashvili, Ierusalimskaya ulitsa, 6, kv. 119; Saga-Silviya Alexandrovna Pavlova, ulitsa Garibaldi, 19, korpus 3, kv. 74; Pelageya Nikolaevna Gribkova, ulitsa Krasny Kazanets, 19, korpus 1, kv. 61; Nina Ivanovna Bekasova, Profsojuznaya ulitsa, 43"B", kv. 15; Ljudmila Grigorievna Komarova, B. Akademicheskaya ulitsa, 53a, kv. 6; Vladimir Dmitrievich Vorobiev, Novocheremushkinskaya ulitsa, 43/30, kv. 152; Irina Vladimirovna Vlasova, ulitsa Veernaya, 3, korpus 5, kv. 300, all of Moscow, and Alexandr Vasilievich Vinogradov, prospekt RKKA, 180, kv. 56, Moskovskaya oblast, Zagorsk, all of U.S.S.R.

Filed Oct. 28, 1975, Ser. No. 626,205
Claims priority, application U.S.S.R., Oct. 28, 1974, 2066134
Int. Cl.[2] C10M *5/00, 7/00;* F16D *69/00*
U.S. Cl. 252—12 **8 Claims**

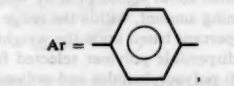
1. A composition for antifriction material, containing from 5 to 98 parts by weight of a polyphenylquinoxaline of the formula:

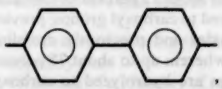


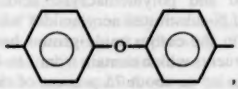
where

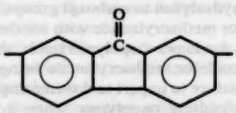
n = 50–300

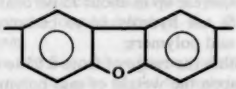
R is a single bond; —O—; $—SO_2—$ or —CO;

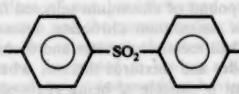












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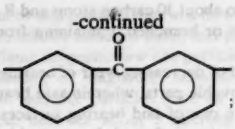
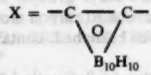
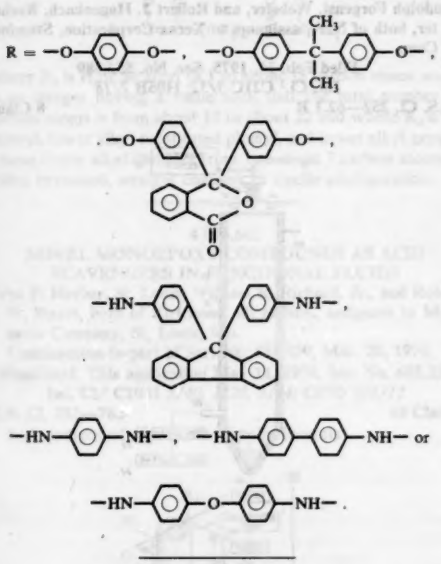
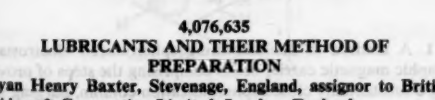


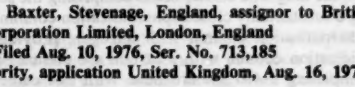
from 1 to 94 parts by weight of an antifriction filler, selected from the group consisting of powdered graphite, molybdenum disulphide, highly dispersed carbon and mixtures thereof; from 0 to 40 parts by weight of a reinforcing filler selected from the group consisting of powdered metallic copper, silver, nickel, zinc, molybdenum, asbestos and mixtures thereof; and from 0.1 to 10 parts by weight of a modifying dopant selected from the group consisting of terephthalaldehyde, tetranitrile of pyromellitic acid, metal polyphosphinates of the general formula $\{M[OP(RR')O]_x\}_n$/1/, where M is a bi- or trivalent metal, X=2–3, and R and R′ are each selected from the group consisting of alkyl, cycloalkyl, alkylaryl and aryl, and carborane-containing compounds of the general formula R-X-R /2/, where



or [—$CH_{10}H_{10}C$—]—$CB_{10}H_{10}C$— R= —H; —C_6H_5; —CH_2OH; —C_6H_5OH; —COOH, or of the general formula —OC $CB_{10}H_{10}C$ COR—$_n$ /3/, where n = 5–10 for oligomers and n = 200–300 for polymers, while







4,076,635

LUBRICANTS AND THEIR METHOD OF PREPARATION

Bryan Henry Baxter, Stevenage, England, assignor to British Aircraft Corporation Limited, London, England

Filed Aug. 10, 1976, Ser. No. 713,185

Claims priority, application United Kingdom, Aug. 16, 1975, 34181/75

Int. Cl.[2] C10M *3/18, 5/14, 7/20, 7/24*

U.S. Cl. 252—18 **11 Claims**

1. A lubricant comprising a colloidal form of a metal oxide hydrate,

said metal selected from the group consisting of the elements in the first transition period of the periodic table such that the molecules in the colloid have uncancelled positive ionic charges, and

a fatty acid selected such that each molecule has a negative ionic charge and a chain length of about 16 to 24 carbon molecules;

wherein said fatty acid molecules are combined with said metal oxide hydrate molecules on the surface of the colloidal particles thereby balancing the ionic charges thereof and forming a stable surface layer on the colloidal particles.

5. A method of preparing the lubricant of claim 1 including the steps of forming a suspension of colloidal particles of metal oxide hydrate in a suspending medium, adding the fatty acid to the suspension in a proporation not substantially greater than 20% by weight of the metal oxide hydrate, dispersing the fatty acid such that it combines with a surface region of the colloidal particles, and removing the suspending medium.

4,076,636

OVERBASED POLYARYLAMINE-ARYLHYDROXY (ALKOXY) SULFIDES AND LUBRICANT COMPOSITIONS CONTAINING SAME

John C. Nnadi, Lagos, Nigeria, assignor to Mobil Oil Corporation, New York, N.Y.

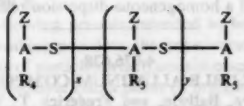
Filed Jan. 2, 1976, Ser. No. 646,126

Int. Cl.[2] C10M *1/10*

U.S. Cl. 252—25 **13 Claims**

1. An oil-soluble overbased compound obtained by the process comprising

reacting a polyarylamine-arylhydroxy (alkoxy) sulfide having the general chemical formula:



wherein

x is an integer of from 1 to about 10;

y is an integer of from 0 to about 10;

A is an aromatic hydrocarbon moiety;

Z is a radical selected from the group consisting of $—NR_1R_2$ and $—OR_3$;

R_1 and R_2 are alkyl of from 1 to about 10 carbon atoms, aryl, hydrogen,

or combinations thereof;

R′ is alkyl of from 1 to about 10 carbon atoms, aryl or hydrogen;

R_3 is hydrogen, alkyl of from 1 to about 200 carbon atoms, aryl or alkyl-substituted aryl where the alkyl substituent is comprised of from 1 to about 200 carbon atoms;

R_4 is aryl or alkyl-substituted aryl where the alkyl substituent is comprised of from 1 to about 200 carbon atoms;

R_5 is alkyl of from 1 to about 200 carbon atoms, aryl or alkyl-substituted aryl where the alkyl substituent is comprised of from 1 to about 200 carbon atoms

with one or more basic metallic compounds selected from the group consisting of NaOH, LiOH, KOH, $Mg(OH)_2$, $Ca(OH)_2$, $Sr(OH)_2$ and $Ba(OH)_2$

in the presence of CO_2 and methanol.

2. A lubricant composition comprising a major portion of an oil of lubricating viscosity or grease thereof and an oxidation property improving amount of the overbased compound of claim 1.

4,076,637
METAL DISPERSIONS AND METHOD FOR PRODUCING SAME

Gerald L. Hurst, Austin, Tex., assignor to Tyler Corporation, Dallas, Tex.

Filed Sep. 29, 1976, Ser. No. 727,679
Int. Cl.² C10M *1/10, 3/02, 5/02, 7/02*
U.S. Cl. 252—26 **26 Claims**

1. A method of manufacturing a high density metal-containing lubricant comprising:
   a. heating a solid metal and a lubricant fluid which is thermally stable at the melting point of said metal until the metal becomes molten, the lubricant fluid present in an amount effective to maintain a homogeneous dispersion of microspheres of said molten metal;
   b. admixing said molten metal with said lubricant fluid to form a homogeneous dispersion of microspheres of said metal within the lubricant fluid; and
   c. cooling said lubricant fluid containing said molten metal microspheres to thereby solidify said microspheres.

15. A method of manufacturing high density metal-containing lubricant comprising:
   a. heating a solid metal and a carrier fluid which is thermally stable at the melting point of said metal until said metal becomes molten, the carrier fluid present in an amount effective to maintain a homogeneous dispersion of microspheres of said molten metal;
   b. admixing said molten metal with said carrier fluid to form a homogeneous dispersion of microspheres of said molten metal within said carrier fluid and then cooling the resulting mixture to solidify said microspheres;
   c. separating said carrier fluid from the resulting metal microspheres; and
   d. admixing said metal microspheres with a lubricant fluid which is thermally unstable at the melting point of said metal until a homogeneous dispersion results.

4,076,638
OIL-SOLUBLE ALUMINUM COMPOSITIONS

Derek Redmore, Ballwin, and Frederick T. Welge, Webster Groves, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Sep. 22, 1975, Ser. No. 616,174
Int. Cl.² C10M *1/40*
U.S. Cl. 252—33.2 **17 Claims**

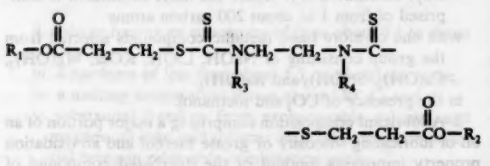
1. The process of preparing an oil-soluble aluminum dispersion which comprises reacting alumina with a mixture of oil-soluble sulfonic and carboxylic acids, the mole ratio of sulfonic to carboxylic acids being from about 4:1 to 1:2.

4,076,639
LUBRICANT COMPOSITIONS

Robert F. Bridger, Hopewell, and Ronald J. Cier, East Windsor, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

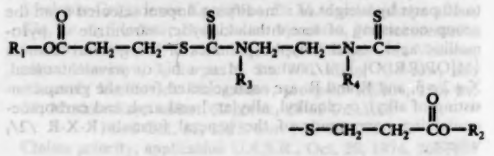
Filed Aug. 30, 1976, Ser. No. 718,699
Int. Cl.² C10M *1/38, 3/32;* **C07C** *153/00, 154/00*
U.S. Cl. 252—47.5 **18 Claims**

1. A lubricant composition containing a major amount of an oil of lubricating viscosity or a grease prepared therefrom and a minor amount sufficient to improve the antiwear properties thereof an alkyl-beta-thiopropionic acid ester having the structure



wherein R_1 and R_2 are alkyl groups straight or branched, containing from 1 to about 30 carbon atoms and R_3 and R_4 are alkyl groups, straight or branched, containing from 1 to about 12 carbon atoms.

11. A method of decreasing wear of bearing surfaces having at least two movable parts, wherein said bearing surfaces are steel or wherein one of said bearing surfaces is steel and another of said bearing surfaces is bronze, which comprises dispersing between said surfaces a lubricant composition characterized by a major amount of an oil of lubricating viscosity or a grease prepared therefrom and a minor amount sufficient to improve the antiwear properties thereof of an alkyl-beta-thiopropionic acid ester having the structure



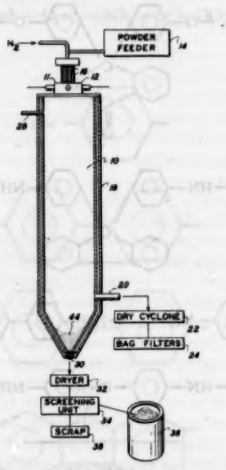
wherein R_1 and R_2 are alkyl groups, straight or branched, containing from 1 to about 30 carbon atoms and R_3 and R_4 are alkyl groups, straight or branched, containing from 1 to about 12 carbon atoms.

18. Dioctyl 6,9-diaza-6,9-dimethyl-4,11-dithia-5,10-dithio tetradecanoate.

4,076,640
PREPARATION OF SPHEROIDIZED PARTICLES

Rudolph Forgensi, Webster, and Robert J. Hagenbach, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 24, 1975, Ser. No. 552,589
Int. Cl.² C21C *5/52;* **H05B** *7/18*
U.S. Cl. 252—62.1 R **8 Claims**



1. A method of manufacturing spheroidized electrostatographic magnetic carrier beads comprising the steps of providing a substantially closed spheroidization column, purging said spheroidization column with nitrogen, providing said spheroidization column with a carbon arc plasma flame assembly comprising a 400 kw arc head with one cathode and three carbon anodes, energizing said arc head with a DC power supply to provide an electrical current flow of between about 650 and 750 amperes between said cathode and each of said anodes, providing a supply of argon gas to said cathode and a supply of nitrogen gas to said anodes to form a plasma flame having temperatures of up to about 10,000° K, providing a

supply of oxygen to said plasma flame at a flow rate of between about 100 and about 200 standard cubic feet per hour, feeding to said plasma flame magnetic raw ore particles selected from the group consisting of magnetite, hematite, taconite, and ilmenite wherein said ore particles have an average particle diameter of from between about 5 microns and about 600 microns and are fed to said plasma flame in the presence of nitrogen carrier gas for said ore particles whereby said ore particles are at least partially melted to form globules thereof, and allowing said globules to fall by gravity in said spheroidization chamber wherein said globules cool and solidify into spheroidized particles having an average saturation magnetic moment of between about 50 and about 85 electromagnetic units per gram.

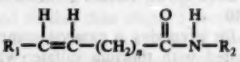
4,076,641

ω-AND CIS ALKENOIC ACID AMIDES IN ELECTROSTATOGRAPHIC DEVELOPERS

Charles G. Scouten, Webster, N.Y., and Willard C. Hamilton, Morganville, N.J., assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 3, 1976, Ser. No. 692,257
Int. Cl.² G03G 9/08; G03Q 9/10
U.S. Cl. 252—62.1 P **6 Claims**

1. An image developing material comprising particles, said particles includng finely divided toner material and a minor proportion based on the weight of said toner material of an additive comprising



where R_1 is H or an alkyl of 1 to about 18 carbon atoms and n is an integer having a value such that the total number of carbon atoms is from about 10 to about 22 and where R_2 is H, phenyl, lower alkyl substituted phenyl, and lower alkyl groups where lower alkyl includes from 1 to about 7 carbon atoms in either branched, straight chained, or cyclic configuration.

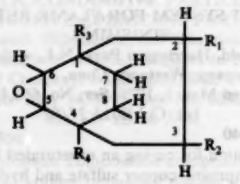
4,076,642

NOVEL MONOEPOXY COMPOUNDS AS ACID SCAVENGERS IN FUNCTIONAL FLUIDS

John F. Herber, St. Louis; William R. Richard, Jr., and Robert W. Street, both of Kirkwood, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 454,539, Mar. 25, 1974, abandoned. This application May 11, 1976, Ser. No. 685,222
Int. Cl.² C10M 3/40, 3/20, 3/14; C07D 303/12
U.S. Cl. 252—78.5 **18 Claims**

1. A compound represented by the formula

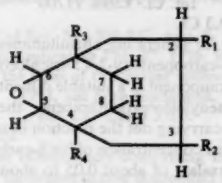


wherein R_1 is $-(CH_2)_{0-3}-C(O)OR$, $-C(O)R$ or $-CH_2OR$; R is an alkyl radical having from 3 to about 15 carbon atoms; R_2 is R_1, hydrogen or an alkyl radical having from 1 to about 9 carbon atoms; R_3 and R_4 are individually hydrogen or an alkyl radical having from 1 to about 4 carbon atoms.

7. A hydraulic fluid composition comprising

(A) at least about 50 percent by weight of a base stock material selected from the group consisting of esters and amides of an acid of phosphorus, di- or tricarboxylic acid esters, esters of polyhydric compounds, and mixtures thereof, and

(B) from about 0.1 to 15 percent by weight of an epoxide compound represented by the structure



wherein R_1 is $-(CH_2)_{0-3}-C(O)OR$, $-C(O)R$, or $-CH_2OR$ where R is an alkyl radical having from 1 to about 18 carbon atoms, R_2 is R_1, hydrogen or an alkyl radical having from 1 to about 9 carbon atoms; R_3 and R_4 are individually hydrogen or an alkyl radical having from 1 to about 4 carbon atoms.

4,076,643

PRE-MIXES INTENDED TO BE ADDED TO DETERGENT POWDERS BY POST-ADDITION

Jacques Brahm, Grimbergen, and Julien Mulders, Dworp, both of Belgium, assignors to Solvay & Cie., Brussels, Belgium

Filed Oct. 9, 1974, Ser. No. 513,501
Claims priority, application Belgium, Nov. 9, 1973, 137587
Int. Cl.² C11D 3/37, 3/20, 11/00
U.S. Cl. 252—89 R **13 Claims**

1. In a free-flowing pre-mix intended to be post-added to detergent or washing powders, the improvement wherein the pre-mix consists of particles which consist essentially of, in the form of a water-soluble salt, a linear or branched hydroxycarboxylic polymer or copolymer, the main chain of which contains essentially carbon and carries carboxyl and hydroxyl groups in the respective proportion of 1:10 and 20:1, and one or more surface-active agents which are liquid or paste-like at a temperature below 180° C, and supported by said polymer or copolymer, the amount of said surface-active agent being from about 20% to 120% by weight of the amount of said polymer or copolymer.

10. Process for the manufacture of a free-flowing pre-mix of particles intended to be post-added to detergent or washing powders, consisting essentially of mixing a water-soluble salt of a linear or branched hydroxycarboxylic polymer or copolymer, the main chain of which contains essentially carbon and carries carboxyl and hydroxyl groups in the respective proportions of 1:10 to 20:1, with one or more surface-active agents which are liquid or paste-like at a temperature below 180° C to form a mixture, and then granulating the mixture.

4,076,644

STORAGE STABILE POLYOL-CHLOROFLUOROALKANE COMPOSITION

James Gordon Burt, Oxford, Pa., and Howard Elliot Phillips, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 8, 1976, Ser. No. 647,562
Int. Cl.² C08G 18/14; C08K 5/02
U.S. Cl. 252—182 **1 Claim**

1. A mixture comprising polyol suitable for polyurethane foam preparation and about from 1 to 40 parts by weight per 100 parts by weight of polyol, of $CHCl_2CF_3$.

4,076,645

CHEMICAL LIGHTING PROCESS AND COMPOSITION

Mary-Louise Vega, Califon, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Jan. 10, 1977, Ser. No. 758,253
Int. Cl.[2] C09K *11/00*
U.S. Cl. 252—188.3 CL 5 Claims

1. In a process for generating chemiluminescence comprising reacting bis(6-carbopentoxy-2,4,5-trichlorophenyl) oxalate with a peroxide component in a suitable diluent in the presence of a 9,10-bis(phenylethynyl)anthracene the improvement which comprises carrying out the reaction in sufficient diluent to provide an initial concentration of bis(6-carbopentoxy-2,4,5-trichlorophenyl)oxalate of about 0.05 to about 0.09 mole per liter of reaction mixture.

4,076,646

LIQUID CRYSTAL COMPOSITION FOR FIELD EFFECT DISPLAY DEVICES

Fumio Nakano; Hisao Yokokura, and Kenji Murao, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 8, 1976, Ser. No. 721,410
Claims priority, application Japan, Sep. 12, 1975, 50-110105
Int. Cl.[2] C09K *3/34;* G02F *1/13*
U.S. Cl. 252—299 7 Claims

1. A liquid crystal composition for field effect display devices, which comprises a nematic liquid crystal composition having a positive dielectric anisotropy and at least one of o-terphenyl and m-terphenyl.

4,076,647

OPTICAL GLASS

Marga Faulstich, Mainz, and Franz Reitmayer, Drais, both of Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed Jul. 22, 1975, Ser. No. 598,137
Claims priority, application Germany, Jul. 24, 1974, 2435554
Int. Cl.[2] C09K *11/42, 11/46;* C03C *3/16*
U.S. Cl. 252—301.4 P 6 Claims

1. Optical glass with a path length substantially independent of temperature and optical properties within the range: n_e = 1.59 to 1.65, and ν_e = 55 to 46, of which the value $Ge_{abs} \times 10^6$/° C is not more than 2.0 and the coefficient of expansion $\alpha \times 10^7$/° C is not more than 123 in the temperature range −30° to 70° C, said glass having a modulus of elasticity (kp/cm²) of between 5600 and 4600, a Poisson's ratio of between 0.270 and 0.300, and consisting essentially of, in weight percent:

P_2O_5 = 40 to 55
BaO = 25 to 54
Nb_2O_5 = 6 to 12
SiO_2 = 0 to 5
B_2O_3 = 0 to 5
K_2O = 0 to 4
MgO = 0 to 5
CaO = 0 to 15
ZnO = 0 to 5
PbO = 0 to 8
CdO = 0 to 15
Sb_2O_3 = 0 to 15
Nd_2O_3 = 0 to 10
Al_2O_3 = 0 to 3
La_2O_3 = 0 to 5
ZrO_2 = 0 to 2
Ta_2O_5 = 0 to 5
WO_3 = 0 to 3

with the sum of the alkaline earth oxides + Nb_2O_5 at least 46% by weight.

4,076,648

SELF-DISPERSIBLE ANTIFOAM COMPOSITIONS

Meyer Robert Rosen, Spring Valley, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 1, 1976, Ser. No. 691,395
Int. Cl.[2] B01D *19/04*
U.S. Cl. 252—358 12 Claims

1. A non-aqueous silicone antifoam composition consisting essentially of a lipophilic nonionic surface active agent having a hydrophilic-lipophilic balance value of up to about 10 homogeneously dispersed in a non-emulsified hydrophobic diorganosiloxane antifoam agent, wherein said surface active agent is selected from the group consisting of organic surface active agents and siloxane surface active agents consisting essentially of siloxy units of the formula $R_3SiO_{0.5}$, R_2SiO and $[R'''(R'')_nR']Si(R)O$ wherein R is a methyl radical, R' is a divalent propylene radical, R'' is an oxyalkylene group, R''' is an alkoxy radical of 1 to 4 carbon atoms and *n* is an integer, and wherein the amount ratio of said surface active agent to said antifoam agent ranges from about 0.2 to about 25 parts by weight of the surface active agent per 100 parts by weight of the antifoam agent.

4,076,649

PRODUCTION OF N-ALKYLATED AMINES AND CATALYST THEREFOR

Seymour Baron, Wayne, N.J., assignor to Hexcel Corporation, Dublin, Calif.

Filed Apr. 2, 1976, Ser. No. 673,142
Int. Cl.[2] B01J *27/02;* C01B *17/96;* C07C *87/00*
U.S. Cl. 252—440 4 Claims

1. A process for preparing a catalyst comprising an inert carrier impregnated with thorium sulfate, which comprises contacting said inert carrier with an aqueous solution of thorium nitrate to impregnate the inert carrier with thorium nitrate, heating the thus impregnated carrier to a temperature above about 150° C. for a time sufficient to allow said thorium nitrate to be converted to thorium oxide, and reacting said thorium oxide with sulfur trioxide to convert the thorium oxide to thorium sulfate.

2. A process for preparing a catalyst comprising an inert carrier impregnated with thorium sulfate, which comprises contacting the inert carrier with an aqueous solution of thorium nitrate to impregnate the inert carrier with thorium nitrate, heating the carrier to a temperature below the decomposition temperature of thorium nitrate to remove water therefrom, and converting the thorium nitrate to thorium sulfate by contacting the carrier impregnated with thorium nitrate with a mixture of concentrated sulfuric acid and an organic solvent, the ratio by volume of sulfuric acid to organic solvent being in the range of from about 5:1 to about 20:1.

4,076,650

CATALYST SYSTEM FOR FLAME RETARDANT FINISHING

Harold McDonald, Harrington Park, N.J., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Mar. 1, 1976, Ser. No. 662,474
Int. Cl.[2] B01J *27/02*
U.S. Cl. 252—440 1 Claim

1. A composition for curing an unsaturated flame retardant on a textile comprising copper sulfate and hydrogen peroxide wherein said unsaturated flame retardant comprises at least one copolycondensed oligomeric vinylphosphonate consisting essentially of the product resulting from the reaction, in stoichiometric ratio of from about 1:10 to 10:1, between a bis (2-haloalkyl) vinylphosphonate and at least one pentavalent phosphorus ester of the structure $ROP(=O)XY$ where *R* is selected from the class consisting of C_1–C_{20} alkyl and C_1–C_{20} chloro- or bromoalkyl groups and X and Y are groups selected from the class consisting of RO—, C_1–C_{20} alkyl, C_2–C_{20} alkenyl, phenyl, phenoxy, amino, C_1–C_{20} alkyl substituted amino,

phenyl substituted amino, C_2-C_{20} alkylene bonded to the same or to another ROP(=O) moiety and C_2-C_{20} alkyleneoxy and C_2-C_{20} alkylenedioxy bonded to the same or to another ROP(=O) moiety, wherein said reaction is carried out at an elevated temperature for a period of time sufficient to evolve R-halide as a byproduct and to form a P(O)-O-alkylene-O-P(O) linkage, with the proviso that said product is not the homocondensed product of said bis (2-haloalkyl) vinylphosphonate and the weight ratio of copper sulfate to hydrogen peroxide is from about 1:1 to about 1:210.

4,076,651

AGGLOMERATED SILICEOUS BODIES

Roland Jacques, Ales, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Nov. 16, 1976, Ser. No. 742,243

Claims priority, application France, Nov. 20, 1975, 75 35453

Int. Cl.[2] B01J *21/08, 29/00;* **C01B** *33/12*

U.S. Cl. 252—451 **15 Claims**

1. A method for preparing agglomerated siliceous bodies of large dimensions, exhibiting improved physical strength and wear-resistance, from silica hydrogel particles, comprising the steps of:

a. partially desiccating silica hydrogel particles by heating for a period of less than about 5 seconds in a medium having a temperature in the range of from about 300° to about 1,000° C to yield modified particles having a water content within the range of from about 25 to about 50%; and,

b. compressing said modified particles to form a shape-sustaining, agglomerated siliceous body.

2. The method of claim 1, wherein said silica hydrogel particles employed in the partial desiccating step have a pH greater than or equal to about 6.

3. The method of claim 2, further comprising the step of preparing said silica hydrogel particles prior to said partial desiccating step by gelling droplets of silica sol in a liquid which is substantially immiscible with water.

4,076,652

ELASTIC RESISTOR COMPOSITIONS CONTAINING METALLIC-CONDUCTIVE PARTICLES AND CONDUCTIVE LUBRICANT PARTICLES

James Barry Ganci, Wilmington, and Sebastian V. R. Mastrangelo, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 24, 1976, Ser. No. 689,387

Int. Cl.[2] H01B *1/06*

U.S. Cl. 252—504 **9 Claims**

1. An elastic resistor composition comprising:

i. from 15 to 45 volume percent of metallic-conductive transition metal compound particles, said particles having a Knoop microhardness at 100 grams of applied load (K_{100}) of at least 500 kg/mm^2 and an electrical resistivity of less than 1000 microohm-cm,

ii. from 4 to 30 volume percent of electrically conductive graphite particles having lamellarly ordered, mobile crystalline planes and a bulk conductivity of at least about 10^{-3} reciprocal ohm-cm, the sum of (i) and (ii) being 25 to 55 volume percent, and

iii. from 45 to 75 volume percent of elastomer.

4,076,653

DETERGENT COMPOSITIONS

Charles Bloor Davies, Wallasey; James Francis Davies, Wirral, and William Frederick Soutar Neillie, Birkenhead, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 386,827, Aug. 8, 1973, Pat. No. 3,957,695. This application Feb. 27, 1976, Ser. No. 662,094

The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.

Int. Cl.[2] C11D *3/065*

U.S. Cl. 252—532 **18 Claims**

1. A detergent composition comprising from about 5% to about 40% of a detergent active compound selected from the group consisting of an anionic active which does not form an insoluble calcium salt during use, a nonionic active, an amphoteric active, a zwitterionic active and mixtures thereof, from about 10% to about 75% of sodium or potassium carbonate, and from about 5% to about 60% of finely divided precipitated calcium carbonate prepared by passing carbon dioxide into a suspension of calcium hydroxide said calcium carbonate having a surface area of about 10 to about 150 square meters per gram (m^2/g), the percentages being expressed by weight of the composition.

4,076,654

PROCESS FOR PRODUCING A FLAME- AND SMOKE-RETARDED, NON-SHRINKABLE, FLEXIBLE POLYURETHANE FOAM

Toshio Yukuta, Kodaira; Takashi Ohashi, Iruma; Minoru Kojima, Kodaira, and Akira Suzuki, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Oct. 20, 1976, Ser. No. 734,167

Claims priority, application Japan, Oct. 24, 1975, 50-127418

Int. Cl.[2] C08G *18/14, 18/66*

U.S. Cl. 260—2.5 AM **12 Claims**

1. A process for producing a flame- and smoke-retarded, non-shrinkable, flexible polyurethane foam, which comprises reacting

A. a polyol having at least two active hydrogen atoms and a molecular weight of from 1,000 to 10,000,

B. a low molecular weight polyhydroxyl compound having a molecular weight of from 60 to 700,

C. an organic polyisocyanate, and

D. an ammonium compound which prevents shrinkage of said flexible polyurethane foam upon production, which generates ammonia gas at a temperature below 100° C and which decomposes at a temperature beneath the temperature of the reaction to provide said polyurethane foam, said ammonium compound also functioning as a catalyst for the reaction,

wherein the equivalent weight ratio of the low molecular weight polyhydroxyl compound (B) to the polyol (A) is ranging from 0.5 to 2.0 and the amount of the ammonium compound (D) based on 100 parts by weight of the polyol (A) is ranging from 0.5 to 10 parts by weight.

4,076,655

PHOTODEGRADABLE ATACTIC POLYSTYRENE COMPOSITIONS

Arne O. Finberg, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 436,322, Jan. 24, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,083

Int. Cl.[2] C08K *5/07*

U.S. Cl. 260—2.5 HB **7 Claims**

1. A composition of atactic polystyrene blended with a small amount of benzoin, based on the weight of the polystyrene, sufficient to accelerate the photodegradation of said composition.

4,076,656

METHOD OF PRODUCING POROUS PLASTIC MATERIALS

LeRoy A. White, Somers, and William H. Holley, Rockville, both of Conn., assignors to DeBell & Richardson, Inc., Enfield, Conn.

Continuation-in-part of Ser. No. 203,471, Nov. 30, 1971, abandoned. This application Jul. 20, 1973, Ser. No. 381,258

Int. Cl.[2] C08J *9/10, 9/26*

U.S. Cl. 260—2.5 M 5 Claims

1. Method of making porous plastic bodies comprising the steps of dispersing in a fluxable polymer, substantially unplasticized, at least about 45 volume percent of a water-soluble material in particle form and blending therewith a channel-forming water-soluble liquid of less than 10,000 poise at the processing temperature of the polymer, the amount of said liquid being from 0.1 to 15 volume percent to form a network of channels interconnecting the dispersed particles, fluxing and solidifying the polymer blend containing said particles and liquid into a polymer body, and thereafter extracting with water said solid and liquid materials to form a porous plastic body.

4,076,657

POLYURETHANE SMOKE SUPPRESSION ADDITIVE

John J. Kracklauer, Boulder, Colo., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation of Ser. No. 485,855, Jul. 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 227,254, Feb. 17, 1972, abandoned. This application Mar. 12, 1976, Ser. No. 666,529

Int. Cl.[2] C08G *18/14;* C08K *5/56*

U.S. Cl. 260—2.5 AJ 7 Claims

1. A polyurethane foam plastic, having improved smoke suppression properties, consisting essentially of a polyurethane foam plastic containing in chemically uncombined form about from 0.1 to 1%, by wt., based on the polyurethane polymer content of said plastic, of a dicyclopentadienyl iron compound selected from the group consisting of monoalkyl dicyclopentadienyl iron; dialkyl dicyclopentadienyl iron; mono alkanoyldicyclopentadienyl iron dialkanoyldicyclopentadienyl iron; ferrocene condensation dimers and polymers with aldehydes or ketones; vinyl ferrocene copolymers with vinyl chloride, acrylic acid, methyl methacrylate, butadiene, or cyclopentane; and mixtures thereof, and wherein as used herein above the terms alkyl and alkanoyl refer, respectively, to alkyl groups and alkanoyl groups having from one through 20 carbon atoms.

4,076,658

POLY(ARYLOXYPHOSPHAZENE) COPOLYMER FOAMS

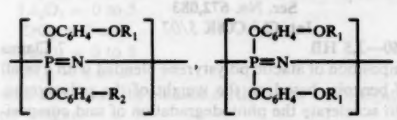
Ronald L. Dieck, and Edwin J. Quinn, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Division of Ser. No. 661,862, Feb. 27, 1976. This application May 13, 1977, Ser. No. 796,742

Int. Cl.[2] C08J *9/06*

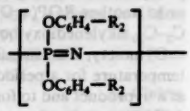
U.S. Cl. 260—2.5 R 10 Claims

1. A process of foaming the copolymers having randomly distributed repeating units represented by the formulas



-continued

and



wherein R_1 is C_1–C_4 linear or branched alkyl and R_2 is hydrogen, C_1–C_{10} linear or branched alkyl or C_1 –C_4 linear or branched alkoxyl with the proviso that when R_2 is alkoxy, OR_1 and R_2 are different, the ratio of $(OC_6H_4OR_1)$:$(OC_6H_4R_2)$ being from about 1:6 to about 6:1 wherein said copolymers are admixed with a chemical blowing agent and heated to a temperature sufficient to decompose said blowing agent.

4,076,659

L-VAL[10]-SOMATOSTATIN AND INTERMEDIATES THERETO

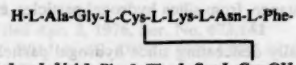
James E. Shields, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 627,492, Oct. 30, 1975, abandoned. This application Mar. 17, 1976, Ser. No. 667,752

Int. Cl.[2] C07C *103/52;* C08L *37/00*

U.S. Cl. 260—8 9 Claims

1. A compound of the formula



and its pharmaceutically acceptable non-toxic acid addition salts, and intermediates to said compound, said intermediates having the formula R-L-Ala-Gly-L-Cys(R_1)-L-Lys(R_2)-L-Asn-L-Phe-L-Phe-L-Trp(R_5)-L-Lys(R_2)-L-Val-L-Phe-L-Thr(R_3)-L-Ser(R_4)-L-Cys(R_1)-X; in which

R is hydrogen or an α-amino protecting group;

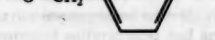
R_1 is hydrogen or a thio protecting group;

R_2 is hydrogen or an ε-amino protecting group;

R_3 and R_4 each are hydrogen or a hydroxy protecting group;

R_5 is hydrogen or formyl; and

X is hydroxy or



in which the resin is polystyrene; with the proviso that, when X is hydroxy, R, R_1, R_2, R_3, R_4, and R_5 each are hydrogen, and, when X is

R, R_1, R_2, R_3, and R_4 each are other than hydrogen.

4,076,660

NON-ELASTOMERIC RAPID-SETTING POLYURETHANES

Franciszek Olstowski, Freeport, and Donald Bob Parrish, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 4, 1974, Ser. No. 448,129

Int. Cl.[2] C08K *5/10;* C08L *75/04, 75/08*

U.S. Cl. 260—9 10 Claims

1. A non-elastomeric non-cellular product having a density of at least about 1 gram/cc which is demoldable within about

5 minutes after admixture of the components of a composition which is the reaction product of a polyurethane-forming composition comprising:

A. a polyol component consisting of
1. a liquid monomeric aliphatic triol having from 3 to about 6 carbon atoms or mixtures thereof and
2. a liquid propylene oxide derivative having at least 2 hydroxyl groups and an OH equivalent weight of less than about 230 or mixtures thereof, wherein Components (A1) and (A2) are present in quantities such that the hydroxyl equivalent ratio of (A1): (A2) is from about 0.25:1 to about 2:1;

B. an organic polyisocyanate;

C. as a modifier substance a liquid ester of a carboxylic acid or mixtures thereof, said modifier having a boiling point above about 150° C;

D. a non-amine containing catalyst for urethane formation; wherein Components (A) and (B) are present in quantities so as to provide an NCO:OH equivalent ratio of from about 0.8:1 to about 1.5:1; Component (C) is present in quantities of from about 10% to about 40% by weight based upon the sum of the weights of Components (A), (B) and (C); and Component (D) is present in quantities of from about 0.001% to about 2% by weight based upon the sum of the weights of Components (A), (B) and (C).

4,076,661
ADHESIVES BASED ON AQUEOUS DISPERSIONS OF BUTADIENE COPOLYMERS, POLYVINYLPYRROLIDONES AND ANIONIC MACROMOLECULAR COMPOUNDS

Karl-Heinz Kassner, Dusseldorf, Germany, assignor to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Dusseldorf-Holthausen, Germany

Filed Jun. 29, 1976, Ser. No. 700,890
Claims priority, application Germany, Jul. 2, 1975, 2529512
Int. Cl.² C08L *1/28*
U.S. Cl. 260—17 R **5 Claims**

1. An adhesive consisting essentially of an aqueous dispersion containing from 20% to 50% by weight of adhesive solids consisting of a mixed polymerizate of butadiene with monomers selected from the group consisting of styrene and acrylonitrile, containing from 0.5% to 3% by weight of the mixed polymerizate of carboxyl groups derived from monomers polymerizable with butadiene, having a further content, based on said mixed polymerizate of

a. from 1% to 3% by weight of a vinylpyrrolidone compound having a K value of between 30 and 90 selected from the group consisting of polyvinylpyrrolidone and water-soluble copolymers of vinylpyrrolidone, and

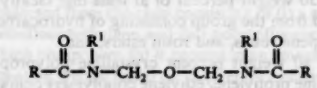
b. from 0.1% to 0.5% by weight of at least one carboxyl-group-containing, water-soluble, macromolecular compound and its water-soluble salts.

4,076,662
MODIFIED AMINOPLAST COMPOSITIONS

Karl Schnee, Maintal; Steffen Piesch, Oberursel, Taunus, and Dieter Tichy, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Filed Dec. 15, 1976, Ser. No. 750,859
Claims priority, application Germany, Dec. 23, 1975, 2558149
Int. Cl.² C08G *2/00, 14/02;* B32B *21/00;* C08L *1/00*
U.S. Cl. 260—17.3 **7 Claims**

1. An uncured condensate of formaldehyde with melamine and/or urea, the condensate being mixed with from about 0.5 to about 40% based on its solids weight, of a plasticizing ether



in which each R is hydrogen or methyl and each R^1 is hydrogen or $—CH_2OH$, the condensate being unetherified or etherified with a C_1 to C_4 alcohol.

4,076,663
WATER ABSORBING STARCH RESINS

Fusayoshi Masuda; Kazuo Nishida, and Akira Nakamura, all of Kyoto, Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

Filed Mar. 29, 1976, Ser. No. 671,148
Claims priority, application Japan, Mar. 27, 1975, 50-37669
Int. Cl.² C08L *3/06*
U.S. Cl. 260—17.4 GC **21 Claims**

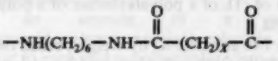
1. A process for producing a water-absorbing resin which comprises polymerizing (a) at least one of natural starch and α starch, (b) at least one monomer having a single polymerizable double bond which is a water-soluble or becomes water-soluble by hydrolysis, and (c) a crosslinking agent, and if the monomer (b) is one which becomes water soluble by hydrolysis, thereafter subjecting the resulting product to hydrolysis.

4,076,664
612 OR 610/6I OR 6T/636 POLYAMIDE TERPOLYMER

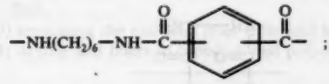
Rolando Umali Pagilagan, Parkersburg, W. Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 13, 1975, Ser. No. 631,692
Int. Cl.² C08G *69/26*
U.S. Cl. 260—18 N **3 Claims**

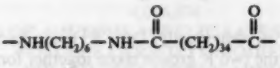
1. A terpolymer resin of sufficiently high molecular weight to be molded into shaped articles consisting essentially of the following repeating segments


(1)

wherein X is 8 or 10;


(2)

; and


(3)

wherein segment (1) is present in an amount up to 80% by weight, based upon the resin weight, segment (2) is present in an amount between about 15% and about 25% by weight, based upon the resin weight, and segment (3) is present in an amount between about 3% and about 10% by weight, based upon the resin weight.

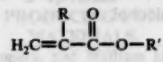
4,076,665
POLYACRYLATE REACTION PRODUCTS

Nelson E. Lawson, Trenton, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Division of Ser. No. 604,488, Aug. 14, 1975, Pat. No. 4,035,320, and a continuation-in-part of Ser. No. 274,409, Jul. 24, 1972, abandoned, and Ser. No. 434,440, Jan. 18, 1974, abandoned. This application Dec. 22, 1976, Ser. No. 753,612
The portion of the term of this patent subsequent to Jul. 12, 1994, has been disclaimed.
Int. Cl.² C09D *3/66, 3/81, 11/10*
U.S. Cl. 260—22 CB **6 Claims**

1. The polyacrylate reaction product of,

a. an equivalent excess of an acrylic compound of the formula:



wherein R is selected from hydrogen and methyl; R′ is selected from hydrogen, methyl and ethyl; and

b. a polyester polyol obtained by the condensation of

i. an aliphatic polycarboxylic acid having a molecular weight of at least 325 and at least 19 carbon atoms, inclusive, said acid being the adduct of a fatty acid and acrylic acid; with

ii. an equivalent excess of an aliphatic polyol having at least two hydroxyl groups and a molecular weight of between about 60 to about 250; said reaction of (a) and (b) being under conditions wherein said acrylic compound does not polymerize.

4,076,666

RELEASE COMPOSITION

George Edward Power, and Donald Louis Bolling, both of Cincinnati, Ohio, assignors to Formica Corporation, Cincinnati, Ohio

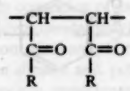
Filed Nov. 3, 1976, Ser. No. 738,214
Int. Cl.² C09D *3/52, 3/66*
U.S. Cl. 260—22 CB **10 Claims**

1. A self-releasing coating composition comprising an organic solvent solution containing from about 0.5 to about 80.0%, by weight, based on the total weight of the composition, of an organic solvent soluble mixture comprising

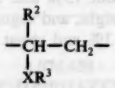
(1) from about 75 to about 99%, by weight, based on the total weight of (1) and (3), of an oil-modified alkyd resin

(2) from about 30 to about 70%, by weight, based on the total weight of (1), of a polyalkylether of a polymethylol melamine and

(3) from about 1 to about 25%, by weight, based on the total weight of (1) and (3), of a copolymer containing from about 15 to about 85 mole percent of recurring units having the formula



wherein each R is, individually, OR^1, R^1 being hydrogen or C_1–C_{22} alkyl, or the two R groups taken together form an oxa group, and the remaining units are recurring units of the formula



wherein R^2 is hydrogen or methyl, R^3 is a C_9–C_{30} alkyl radical and X is O or CH_2.

4,076,667

GRANULES AND PELLETS FOR THE MODIFICATION OF POLYCONDENSATES WHICH CAN BE SHAPED, AS WELL AS THE PROCESS FOR OBTAINING THESE GRANULES AND PELLETS AND SHAPED ARTICLES THUS OBTAINED

Daniel Fontanel, Bron, and Jean Rampin, Theoule-sur-Mer, both of France, assignors to Rhone-Poulenc Textile, France

Filed Mar. 12, 1976, Ser. No. 666,345
Int. Cl.² C08L *67/00, 77/00*
U.S. Cl. 260—22 A **7 Claims**

1. Granules and pellets for modifying polycondensates which can be shaped in the molten state, characterised in that they consist of:

at least 37.5% of polycondensates serving as a carrier, of which at least a part consists of the same polycondensate as that which is to be shaped, in the form of a powder of particle size at least 50 microns,

from 12.5 to 40% of a binder of melting point 70°–100° C which is compatible with the polycondensate to be shaped, and

up to 50% of at least one compound useful to modify the polycondensate which is to be shaped.

4,076,668

RUBBER COMPOSITION

Kunihiro Kaneda; Masashi Kida; Akihiko Nakayama, all of Hiratsuka; Atsushi Kanazawa, Ise; Hiroyuki Kaido, Hiratsuka; Yasuhiro Mizumoto, Hiratsuka, and Tsuneo Koyama, Hiratsuka, all of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1976, Ser. No. 661,858
Claims priority, application Japan, Oct. 4, 1975, 50–119373
Int. Cl.² C08K *5/09*
U.S. Cl. 260—23.7 M **10 Claims**

1. A rubber composition which comprises more than 0.5 wt. parts of a cobalt salt of organic acid, more than 0.5 wt. part of monohydroxybenzoic acid component and 100 wt. parts of a rubber.

4,076,669

AMORPHOUS POLYPROPYLENE IN HYDROGENATED RUBBERY BLOCK COPOLYMERS

Bobby R. Harper, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 3, 1976, Ser. No. 720,318
Int. Cl.² C08L *9/00*
U.S. Cl. 260—23.7 R **10 Claims**

1. A composition comprising:

a hydrogenated plastomer of a monovinyl-substituted aromatic compound and a conjugated diene; and

amorphous polypropylene in an amount within the range of 6–60 parts by weight per 100 parts by weight of said plastomer.

4,076,670

HOT-MELT ADHESIVES HAVING IMPROVED PROPERTIES AT ELEVATED TEMPERATURES

Darryl A. Godfrey, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 27, 1977, Ser. No. 763,266
Int. Cl.² C08L *93/00*
U.S. Cl. 260—27 R **21 Claims**

1. An adhesive composition capable of being used as a hot melt adhesive comprising a blend of

(1) 30 to 70 weight percent polyethylene having a melt index at 190° C. of about 1 to about 50 and a density of about 0.910 g/cm³ to about 0.940 g/cm³

(2) 10 to 50 weight percent of at least one tackifying resin selected from the group consisting of hydrocarbon resins, polyterpene resins, and rosin esters, and

(3) 10 to 40 weight percent crystalline polypropylene or crystalline propylene/ethylene copolymers containing not more than 20 percent by weight ethylene having a melt flow rate at 230° C. of 30 to 180.

4,076,671

FAST CURING RESINOUS COMPOSITIONS

Alan Bright, Washington, England, assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Jan. 23, 1976, Ser. No. 651,916
Claims priority, application United Kingdom, Jan. 24, 1975, 3222/75
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—28.5 AV 20 Claims

1. A coating composition which comprises:

(A) a polymer-monomer mixture comprising:

(a) at least 25% by weight of a homopolymer or copolymer of one or more (C_1–C_8)-alkyl esters of acrylic acid or methacrylic acid;

(b) at least 30% by weight of one or more ethylenically unsaturated polymerizable monomers comprising one or more (C_1–C_8)-alkyl esters of acrylic acid or methacrylic acid;

(c) 1–40% by weight of at least one compound containing at least two ethylenically unsaturated groups per molecule;

optionally,

(d) 0.5–3% by weight of ethylenically unsaturated carboxylic acid;

optionally,

(e) 0.25–1% by weight of paraffin wax;

and,

(B) a catalyst system comprising:

(a) 0.5–10% by weight, based on the weight of polymer-monomer mixture (A), of organic peroxide as catalyst;

(b) 0.1–10% by weight, based on the weight of the polymer-monomer mixture (A), of tertiary amine as accelerator; the relative amounts of the components being chosen so as to give a fast-curing composition, as hereinbefore defined.

4,076,672

LUBRICANTS FOR ORGANIC FIBRES

Peter Huber; Helga Lampelzammer; Ewald Pirson, and Franz Wimmer, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Jul. 29, 1976, Ser. No. 709,700
Claims priority, application Germany, Aug. 11, 1975, 2535768
Int. Cl.[2] C08J *3/00*
U.S. Cl. 260—29.2 M 11 Claims

1. A process for preparing a lubricant for organic fibers which comprises polymerizing an aqueous emulsion of (a) a diorganopolysiloxane having the general formula

$$(HO)_x—(SiR_2O)_n—H_x$$

in which each R is selected from the class consisting of an alkyl radical having up to 5 carbon atoms, a phenyl radical, a halohydrocarbon radical and an aminohydrocarbon radical, x is 0 or 1 and n is an integer of from 3 to 500, with the provision that when x is 0, n is 3, 4 or 5, in the presence of component (b) which is selected from the class consisting of (i) a paraffin wax (ii) polytetrafluoroethylene and (iii) polytrifluorochloroethylene, in which component (b) is present in an amount of from 1 to 70 percent by weight based on the weight of components (a) and (b) to form an aqeuous emulsion in which the diorganopolysiloxane has a viscosity of at least 20,000 cSt at 25° C.

4,076,673

ABSORBENT ARTICLES AND METHODS FOR THEIR PREPARATION

Nelson D. Burkholder, Jr., Hong Kong, Hong Kong, assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 565,880, Apr. 7, 1975, abandoned. This application Sep. 27, 1976, Ser. No. 727,106
Int. Cl.[2] C08L *31/02*
U.S. Cl. 260—29.2 EP 20 Claims

1. A method of preparing a substantially dry, water-swellable polyelectrolyte film which comprises the steps of

(1) preparing a solution of

(A) a member selected from the group consisting of water, lower alcohols, and mixtures thereof,

(B) about 5 to about 60% by weight based on the amount of (A) of a carboxylic polyelectrolyte or mixtures thereof, and

(C) an amount of a water soluble polyamidopolyamine/epichlorohydrin adduct sufficient to cure said polyelectrolyte into a water swellable article,

(2) spreading a coating of said solution on an impervious substrate,

(3) drying said coated substrate to crosslink said polyelectrolyte and

(4) separating said crosslinked polyelectrolyte film from said substrate.

2. A method of preparing substantially water swellable polyelectrolyte fibers which comprises

(1) preparing a solution of

(A) a member selected from the group consisting of water, lower alcohols, and mixtures thereof,

(B) about 5 to about 60% by weight based on the amount of (A) of a carboxylic polyelectrolyte or mixtures thereof, and

(C) an amount of a water soluble polyamidopolyamine/epichlorohydrin adduct sufficient to cure said polyelectrolyte into a water swellable article.

(2) extruding said solution into a bath comprising lower alkyl ketones or chlorinated hydrocarbons to form an extruded fiber,

(3) separating the extruded fiber from said bath, and

(4) drying said fibers to crosslink said polyelectrolyte.

4,076,674

BLENDS OF AQUEOUS ACRYLIC LATEX AND WATER SOLUBLE CARBOXYL MODIFIED POLYCAPROLACTONE ADDUCT

Joseph Victor Koleske, Charleston, and Oliver Wendell Smith, South Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 26, 1976, Ser. No. 690,354
Int. Cl.[2] C08L *61/28*
U.S. Cl. 260—29.4 UA 21 Claims

1. A coating composition comprising a blend of an aqueous acrylic latex and from about 5 to about 50 weight percent, based on the total solids content of said latex, of a water soluble carboxyl modified polycaprolactone adduct selected from the group of:

(Type 1) the water soluble carboxyl modified polycaprolactone adduct reaction product mixture of (i) a polycaprolactone polyol and (ii) from 0.1 to 1 carboxylic anhydride equivalent for each hydroxyl equivalent present in the polycaprolactone polyol of an intramolecular anhydride of a polycarboxylic acid, neutralized with (iii) a base; or

(Type 2) the water soluble carboxyl modified polycaprolactone urethane adduct reaction product mixture of (i) a polycaprolactone polyol, (ii) from 0.025 to 0.9 isocyanato equivalent for each initial hydroxyl equivalent present in the polycaprolactone polyol of an organic polyisocyanate, (iii) from 0.1 to 1 carboxylic anhydride equivalent per

each unreacted hydroxyl equivalent present of an intramolecular anhydride of a polycarboxylic acid, neutralized with (iv) a base; or

(Type 3) the water soluble carboxyl modified polycaprolactone-epoxide adduct reaction product mixture of (i) a polycaprolactone polyol, (ii) from 0.2 to 1 mole of an organic oxirane diepoxide per mole of polycaprolactone polyol initially charged, (iii) from 0.1 to 0.5 carboxylic anhydride equivalent per each unreacted hydroxyl equivalent present of an intramolecular anhydride of a polycarboxylic acid, neutralized with (iv) a base;

wherein said polycaprolactone polyol has at least two hydroxyl groups in the molecule, a hydroxyl number of from 15 to 600 and an average molecular weight of from 290 to about 6,000, and wherein said anhydride has at least one intramolecular carboxylic anhydride group; and a crosslinking agent.

4,076,675

AQUEOUS COATING COMPOSITION FROM AMINOPLAST AND REACTION PRODUCT OF TERTIARY AMINE AND POLYMER CONTAINING RANDOMLY DISTRIBUTED EPOXY GROUPS

Eugene G. Sommerfeld, Penn Valley, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 4, 1975, Ser. No. 547,001

Int. Cl.[2] C08L *37/00, 61/28;* C25D *13/06*

U.S. Cl. 260—29.4 UA **21 Claims**

1. A water-borne thermosetting coating composition consisting essentially of:

(A) 50–97 parts by weight, based on the weight of components (A) plus (C), of an epoxy polymer containing, on the average, 10–150 randomly distributed 1,2-epoxy groups per molecule and having a weight average molecular weight, determined by gel permeation chromatography, using a polystyrene standard, of 25,000–75,000; reacted to the substantially complete consumption of the epoxy groups with

(B) an aqueous solution of about 1–1.25 equilvalents, per equivalent of epoxy group of said epoxy polymer of (A), of a tertiary amine selected from the group consistinng of $R_1R_2R_3N$, pyridine, N-methylpyrrole, N-methyl pyrrolidine, N-methyl morpholine, and mixtures thereof and where R_1 and R_2 are hydroxy-substituted or unsubstitued mono-valent alkyl groups containing one or two carbon atoms and R_3 is a hydroxy-substituted or unsubstituted mono-valent alkyl group containing 1–4 carbon atoms; and

(C) 3–50 parts by weight, based on the weight of components (A) plus (C), of an alkylated aminealdehyde resin, an alkylated amide-aldehyde resin or mixtures thereof;

dissolved or dispersed in water and an organic liquid or mixture of such liquids wherein the water and said organic liquid are in a ratio of from 70:30 to 90:10 and said coating composition having a pH of 10 or above.

4,076,676

AQUEOUS COATING COMPOSITION FROM AMINOPLAST AND REACTION PRODUCT OF TERTIARY AMINE AND POLYMER CONTAINING TERMINAL EPOXY GROUPS

Eugene G. Sommerfeld, Penn Valley, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 4, 1975, Ser. No. 547,000

Int. Cl.[2] C08L *61/28, 63/00;* C25D *13/06;* C08G *59/14*

U.S. Cl. 260—29.4 R **21 Claims**

1. A water-borne thermosetting coating composition consisting essentially of:

(A) 50–97 parts by weight, based on the weight of components (A) plus (C), of an epoxy resin containing, on the average, two terminal 1, 2-epoxy groups per molecule and having a molecular weight of 1,000–5,000 reacted to the substantial.y complete consumption of the epoxy groups with

(B) an aqueous solution of about 1–1.25 equivalents, per equivalent of epoxy group of said epoxy resin of (A), of a tertiary amine selected from the group consisting of $R_1R_2R_3N$, pyridine, N-methylpyrrole, N-methyl pyrrolidine, N-methyl morpholine, and mixtures thereof wherein R_1 and R_2 are hydroxy-substituted or unsubstituted monovalent alkyl groups containing one or two carbon atoms and R_3 is a hydroxy-substituted or unsubstituted monovalent alkyl group containing 1–4 carbon atoms; and

(C) 3–50 parts by weight, based on the weight of components (A) plus (C), of an alkylated aminealdehyde resin, an alkylated amide-aldehyde resin or mixtures thereof;

,dissolved or dispersed in water and an organic liquid or mixture of such liquids wherein the water and said organic liquid are in a ratio of from 70:30 to 90:10 and said coating composition having a pH of 10 or above.

4,076,677

AQUEOUS COPOLYMER DISPERSIONS AND METHOD OF PRODUCING THE SAME

Kazys Sekmakas, Chicago, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed Jun. 23, 1976, Ser. No. 698,860

Int. Cl.[2] C08L *33/02*

U.S. Cl. 260—29.6 E **14 Claims**

1. A method of producing a dispersion of copolymer particles in water which is adapted for use in electrocoating comprising, forming a liquid mixture consisting essentially of monoethylenic monomers including from about 1% to about 30% by weight of monoethylenic carboxylic acid, dispersing said liquid mixture in water containing from about 15–40% of a C_3–C_4 alkanol, based on the weight of the aqueous medium, to form a dispersion, polymerizing said dispersion in the presence of an organic peroxide polymerization catalyst at an elevated temperature, while agitating the dispersion, to form copolymer particles dispersed in the aqueous alcohol-containing medium.

4,076,678

PLASTICIZED POLYMERS OF VINYL ACETATE

Frank Lamb, Oldham; Malcolm Combey, Mellor, and Hugh Melvin Cooper, Cheadle, all of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation-in-part of Ser. No. 406,175, Oct. 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 192,625, Oct. 26, 1971, abandoned. This application Aug. 7, 1975, Ser. No. 602,890

Claims priority, application United Kingdom, Oct. 27, 1970, 50906/70

Int. Cl.[2] C08K *5/11, 5/12;* C08L *3/04*

U.S. Cl. 260—31.6 **9 Claims**

1. A composition comprising a vinyl acetate polymer or copolymer of between 55 and 100% of vinyl acetate with one or more ethylenically unsaturated nonhalogenated comonomers and from 10 to 100% by weight based on the weight of the polymer, of a polyester having a molecular weight, of from 350 to 1500 derived from the reaction of

(i) a polyethylene glycol having a molecular weight up to 500,

(ii) an aliphatic alcohol containing from 3 to 6 carbon atoms and

(iii) a mixture of dibasic acids or anhydrides comprising a mixture of

(a) a phthalic acid or anhydride and

(b) an acid or anhydride selected from succinic, glutaric or adipic or any mixture thereof;

the dibasic acid or anhydride mixture being reacted with the theoretical amounts of alcohol and glycol needed to effect the reaction with the proviso that the glycol may be reacted with the dibasic acids or anhydrides in amounts ranging from 0–10

mol % below the theoretical amount necessary to effect the reaction to up to 20% in excess of the theoretical amount and the alcohol may be reacted in amounts ranging from 0 to 50 mol % below the theoretical amount to up to 20 mole % in excess of the theoretical amount needed to produce the final product and wherein the dibasic acid or anhydride mixture contains phthalic acid or the anhydride thereof in amounts from 5% to 80% by weight of the mixture.

4,076,679
RAPID SETTING POLYURETHANE ELASTOMERS AND PROCESS OF PREPARATION

Robert B. Turner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 651,327, Jan. 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 545,691, Jan. 30, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 761,190

Int. Cl.[2] C08K *5/11, 5/01;* **C08G** *18/04*

U.S. Cl. 260—31.2 N **20 Claims**

1. Non-cellular, non-elastomeric polyurethanes having a density of at least about 1 g/cc, a percent elongation of less than about 100, a heat distortion temperature of at least about 180° F (82° C) and which can be demolded within a period of about 5 minutes without the addition of an external source of heat which polyurethane results from the admixture and reaction of a composition which comprises:

(A) a polyhydroxyl-containing material having from about 2 to about 8 hydroxyl groups and an average OH equivalent weight of not greater than about 250;

(B) an organic polyisocyanate;

(C) as a modifier, from about 1% to about 20% weight based upon the combined weight of Components (A), (B) and (C) of a polymer of one or more ethylenically unsaturated monomers said polymer having the following characteristics:

(1) a molecular weight such that the polymer has a grease melt flow index as determined with a 0.02 inch orifice employing a total weight of 2160 grams at 80° C of from about 1 to about 250 decigrams/minute;

(2) a solubility parameter at 25° C of at least about 8;

(3) and a specific heat of at least about 0.35 cal/g/° C and

(D) a non-amine containing catalyst for urethane formation;

wherein Components (A) and (B) are present in quantities so as to provide an NCO:OH ratio of from about 0.8:1 to about 1.5:1 and with the proviso that when Component (A) has an average functionality of substantially less than about 3, then the average functionality of Component (B) is at least about 2.5.

11. A process for preparing polyurethanes having a density of at least about 1 g/cc, a percent elongation of less than about 100, a heat distortion temperature of at least about 180° F (82° C) and which can be demolded within a period of about 5 minutes without the application of an external source of heat which process comprises:

(1) admixing the components of a composition comprising:

(A) a polyhydroxyl-containing material having from about 2 to about 8 hydroxyl groups and an average OH equivalent weight of not greater than about 250;

(B) an organic polyisocyanate;

(C) as a modifier, from about 1% to about 20%, by weight based upon the combined weight of Components (A), (B) and (C) of a polymer of one or more ethylenically unsaturated monomers having the following characteristics:

(a) a molecular weight such that the polymer has a grease melt flow index as determined with a 0.02 inch orifice employing a total weight of 2160 grams at 80° C of from about 1 to about 250 decigrams/minute;

(b) a solubility parameter at 25° C of at least about 8;

(c) and a specific heat of at least about 0.35 cal/g/° C; and

(D) a non-amine containing catalyst for urethane formation;

wherein Components (A) and (B) are present in quantities so as to provide an NCO:OH ratio of from about 0.8:1 to about 1.5:1 and with the proviso that when Component (A) has an average functionality of substantially less than about 3, then the average functionality of Component (B) is at least about 2.5;

(2) placing the admixed composition into a suitable mold wherein said composition solidifies within less than about 5 minutes to a solid having the aforesaid density, percent elongation and heat distortion temperature; and

(3) subsequently demolding the resultant article from the mold.

4,076,680
POLY(HYDROXYMETHYLENE) SOLUTIONS

Murali K. Akkapeddi, Succasunna, and Herbert K. Reimschuessel, Morristown, both of N.J., assignors to Allied Chemical Corporation, Morristown, N.J.

Filed Aug. 5, 1976, Ser. No. 712,108

Int. Cl.[2] C08K *5/17*

U.S. Cl. 260—32.6 R **7 Claims**

1. A solution in hydrazine of a polymer selected from the group consisting of (a) poly(hydroxymethylene), (b) copolymers of hydroxymethylene with up to about 30 mol percent of ethylenically unsaturated comonomers, and (c) mixtures thereof, said solution containing not more than about 10 percent by weight of water, based on the combined weight of the hydrazine and water.

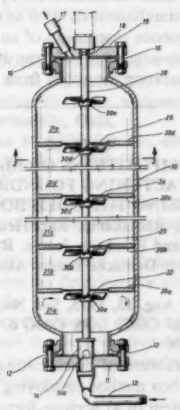
4,076,681
PROCESS FOR DISSOLVING HIGH MOLECULAR WEIGHT OLEFIN POLYMERS IN LIQUID HYDROCARBONS

Robert Emerson Boehme, and Clarence Rhodes Murphy, both of Houston, Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Aug. 19, 1976, Ser. No. 715,803

Int. Cl.[2] C08K *5/01*

U.S. Cl. 260—33.6 PQ **5 Claims**



1. A process for preparing a hot solution of a high molecular weight olefin polymer that contains essentially no undissolved polymer particles which consists essentially of:

a. Preparing a polymer slurry by dispersing fine particles of a high molecular weight olefin polymer in a liquid hydrocarbon heated to a temperature of at least about 190° C,

b. Feeding the polymer slurry of (a) to a first fluid chamber having an inlet and an outlet therein with screens covering both of said inlet and said outlet; the screen covering the

outlet having a smaller mesh than the screen covering the inlet,

c. Discharging polymer solution from said first fluid chamber and passing it through a series of one or more additional fluid chambers, each of which also has an outlet therein with screens covering both the inlet and the outlet, with the screen covering the outlet having a smaller mesh than the screen covering the inlet; the outlet screen of each successive downstream fluid chamber having a smaller mesh than the outlet screen of the upstream fluid chambers,

d. providing stirring in each fluid chamber to sweep retained resin particles free of the covering of the outlet of said chamber,

e. supplying heat to the polymer slurry passing through the fluid chambers to maintain a temperature of at least about 190° C, and

f. recovering from the final fluid chamber a hydrocarbon solution of olefin polymer substantially free of undissolved polymer particles;

said olefin polymer being an olefin polymer having an inherent viscosity of at least 3.5.

4,076,682

FLAMEPROOF NYLON MOLDING COMPOSITIONS

Rainer Theysohn, Ludwigshafen; Rolf Wirmb, Heidelberg; Bernd Leutner, Frankenthal, and Hans-Ulrich Schlimper, Speyer, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sep. 13, 1976, Ser. No. 722,518
Int. Cl.² C08K *3/22, 5/02*
U.S. Cl. 260—37 N **14 Claims**

1. A thermoplastic molding composition comprising a linear nylon, from about 4 to 20% by weight based on the molding composition of an addition produce of hexachlorocyclopentadiene and a dienophile as an organic flameproofing agent, from about 2 to 10% by weight, based on the molding composition of a synergistic metal compound and from about 10 to 60% by weight, based on the molding composition of an inorganic filler, wherein the synergistic metal compound is a zinc oxide which has been manufactured by adding an aqueous solution of a base simultaneously with an aqueous solution of a zinc salt to an aqueous suspension of an inorganic carrier in such a way as to maintain a pH of from 10 to 12 in the suspension, and then separating the solids from the aqueous phase.

4,076,683

MOLDING COMPOSITIONS OR MASSES SUITABLE FOR MANUFACTURING FOUNDRY MOLDS AND CORES USING THE COLD BOX METHOD

Martin Cherubim, Rheinkamp; Karl-Heinz Heinemann, Neukirchen-Vluyn, and Friedrich Josten, Rheinkamp, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Aug. 15, 1975, Ser. No. 605,111
Int. Cl.² C08K *3/36;* C08G *6/02, 18/28*
U.S. Cl. 260—37 N **4 Claims**

1. In the manufacture of quick curing foundry molds and cores by the cold box method employing sand and a two component binder system of a) acetone-formaldehyde condensate and b) a polyisocyanate, said binding system being curable by contact with gaseous amine, the improvement comprising increasing the bending strength of the sand-binder system by conducting the acetone condensation with formaldehyde in a mole ratio of 1.0 mole of acetone to 1.0 to 2.5 moles of formaldehyde, in the presence of 0.005 to 0.015 moles of alkali, acidifying to a pH of 4 and below, followed by the removal of water to produce a low molcular weight non-resinous polymethylol containing a solids content of at least 95%.

4,076,684

ORGANOPOLYSILOXANE COMPOSITIONS AND ELASTOMERS PREPARED THEREFROM

Ernst Wohlfarth; Wolfgang Hechtl, both of Burghausen; Klaus Matejcek, Munich, and Adolf Kleinschwarzer, Marktl, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Dec. 2, 1976, Ser. No. 746,907
Claims priority, application Germany, Dec. 15, 1975, 2556420
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB **11 Claims**

1. A diorganopolysiloxane composition curable at room temperature to elastomers containing glass fibers which have an average length up to about 0.2 mm.

4,076,685

CYANOACRYLATE FOUNDRY BINDERS AND PROCESS

Hubert P. Kögler, Metzkausen, Germany, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Jan. 26, 1973, Ser. No. 326,648
Claims priority, application Germany, Jan. 25, 1972, 2203411
Int. Cl.² C08K *3/36*
U.S. Cl. 260—42.53 **31 Claims**

1. A foundry mix containing sand as the major constituent and a binding amount of up to 10% based on the weight of the sand of a polymerizable binder comprising a cyanoacrylate and a small but effective amount of a polymerizable inhibitor.

4,076,686

HEAT STABILIZED POLYCARBONATE RESIN

Thornton Ross Calkins, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

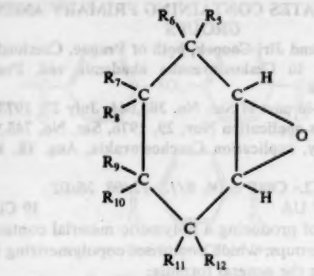
Continuation-in-part of Ser. No. 326,008, Jan. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 102,211, Dec. 28, 1970, abandoned. This application Nov. 6, 1974, Ser. No. 521,479
Int. Cl.² C08R *5/00*
U.S. Cl. 260—45.8 A **6 Claims**

1. An unpigmented aromatic polycarbonate composition stabilized against heat degradation with (a) a minor amount of a phosphite selected from the group consisting of diaryl hydrogen phosphite, dialkyl hydrogen phosphite and alkyl aryl hydrogen phosphite and mixtures thereof wherein the alkyl portion contains 2–25 carbon atoms and the aryl portion contains 1–3 phenyl rings, and (b) 0.01 – 0.5 weight percent of an epoxy compound selected from the group consisting of:

I. Derivatives of epoxy ethane represented by the following formula:

wherein R_1, R_2, R_3 and R_4 are independently selected from the group consisting of hydrogen, an alkyl radical of 1–24 carbon atoms, an aryl radical of 6–24 carbon atoms, $—CH_2OR'$, $—CH_2OCOR'$, $—CH_2OCOR''COOCH_2X$, $CH_2OR''OCH_2X$ wherein R' is selected from the group consisting of an alkyl radical of 1–24 carbon atoms or an aryl radical of 6 to 24 carbon atoms and wherein R'' is an alkylene radical of 1–24 carbon atoms and X is an oxirane ring.

II. Derivatives of epoxy cyclohexane represented by the following formula:



wherein R_5 through R_{12} are independently selected from the group consisting of hydrogen, alkyl radicals of 1–24 carbon atoms, —$COOR_{13}$, —$OCOR_{13}$, —$COOR_{14}X$, —$OCOR_{14}$—COOX wherein R_{13} is an alkyl radical of 1–24 carbon atoms and R_{14} therein is an alkylene radical of 1–24 carbon atoms and X is an oxirane ring.

4,076,687

BICHROMOPHORIC BENZOTRIAZOLE-BENZOXAZOLE ULTRAVIOLET STABILIZERS AND THEIR USE IN ORGANIC COMPOSITIONS

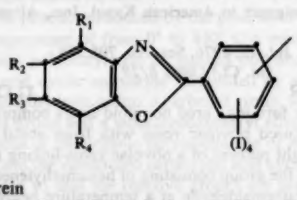
Gether Irick, Jr.; Charles A. Kelly, both of Kingsport, and James C. Martin, Johnson City, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 16, 1976, Ser. No. 715,015
Int. Cl.[2] C08K *5/34*
U.S. Cl. 260—45.8 NT **65 Claims**

1. An organic composition susceptible to ultraviolet light degradation stabilized against such degradation with a stabilizing amount of at least one bichromophoric compound having the formula:

A-B-C

wherein A is a group having the structure

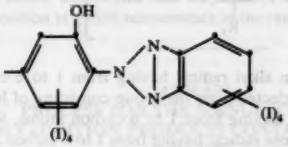


wherein

R_1, R_2, R_3 and R_4 are hydrogen, chloro, bromo, lower alkyl, substituted lower alkyl, cyclohexyl, substituted cycloalkyl, phenyl, substituted aryl, lower alkylaryl, aryl-substituted-aryl, alkoxy, substituted amino, carboalkoxy and the substituents R_1 and R_2, R_2 and R_3 and R_3 and R_4, combined with the carbon atoms to which they are attached, are joined alkylene groups completing a carbocyclic ring, which ring can also be substituted with one or more of the substituents listed above for R_1, R_2, R_3 and R_4;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom attached to the heterocyclic ring and the carbon atom attached to the B group connecting the heterocyclic aromatic A group with the aromatic C group, wherein B is a linking group connecting A and C and is alkylene, arylene, oxy, carbonyloxy, oxycarbonylalkyleneoxy, oxycarbonyl, alkyleneoxycarbonyloxy, oxyalkylenecarbonyloxy, oxycarbonyloxy, alkyleneoxy, oxyalkylene, alkyleneoxyalkyleneoxy, oxyalkylenearylenealkyleneoxy, thio, thioalkyleneoxy, sulfinyldioxy, oxy(alkoxy)phosphinooxy, aminocarbonyl, carbonylamino, N-alkylcarbonylamino, N-alkylaminocarbonyl, N-arylaminocarbonyl, N-arylcarbonylamino, aminocarbonylalkyleneoxy, N-alkylaminocarbonylalkyleneoxy, N-arylaminocarbonylalkyleneoxy, aminocarbonylamino, N-alkylaminocarbonylamino, N-arylaminocarbonyl, N-alkylaminocarbonyl, amino, N-alkylamino, N-arylamino, N-alkylaminoalkyleneoxy, N-arylaminoalkyleneoxy, oxyalkyleneoxy, oxyaryleneoxy, alkyleneaminoalkylene, aryleneaminoarylene, aryleneaminoalkylene and alkyleneaminoarylene; and

wherein C is a group having the formula



wherein I is the same substituent as listed above and is present in all positions of the benzenoid rings except the carbon atom attached to the B group connecting the A and C moieties, and said I substituents can all be one of the substituents listed above or different listed substituents and R_5 is an alkyl group containing 1 to 20 carbon atoms.

4,076,688

POLYCARBONATE STABILIZERS

William F. Cordes, III, East Brunswick, and Robert E. Diehl, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sep. 22, 1975, Ser. No. 615,872
Int. Cl.[2] C08J *3/20*; **C08K** *5/16*
U.S. Cl. 260—45.9 QA **7 Claims**

1. Polycarbonate stabilized against the deteriorating effects of ultraviolet radiation by an effective amount of a stabilizer which is α-cyano-β-(N-cyanoethyl-p-methoxyanilino)acrylonitrile or α-cyano-β-(N-methyl-p-ethoxyanilino)acrylonitrile.

5. A compound selected from the group consisting of α-cyano-β-(N-cyanoethyl-p-methoxyanilino)acrylonitrile and α-cyano-β-(N-methyl-p-ethoxyanilino)acrylonitrile.

4,076,689

ULTRAVIOLET LIGHT STABILIZER COMBINATION FOR POLYMERS

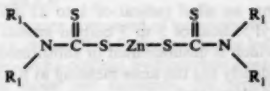
Kenneth R. Mills, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 14, 1976, Ser. No. 686,967
Int. Cl.[2] C08K *5/53*
U.S. Cl. 260—45.75 W **12 Claims**

7. A stabilized polymeric composition comprising a major amount of a polymer of a mono-1-olefin having incorporated therein

a. a small but effective amount, sufficient to stabilize said composition against the deteriorative action of ultraviolet light, of zinc oxide;

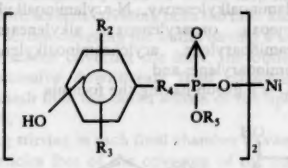
b. a small but effective amount, sufficient to stabilize said composition against the deteriorative action of ultraviolet light, of at least one zinc dihydrocarbyldithiocarbamate represented by the formula



wherein each R_1 group is independently selected from the group consisting of acyclic hydrocarbon radicals having from 1 to 20 carbon atoms and cyclic hydrocarbon radicals having from 5 to 20 carbon atoms; and

c. a small but effective amount, sufficient to stabilize said

composition against the deteriorative action of ultraviolet light, of at least one nickel phosphonate represented by the formula



wherein R_2 is an alkyl radical having from 1 to 6 carbon atoms, R_3 is selected from the group consisting of hydrogen and alkyl having from 1 to 6 carbon atoms, R_4 is a divalent alkylene radical having from 1 to 4 carbon atoms and R_5 is selected from the group consisting of hydrogen and alkyl having from 1 to 30 carbon atoms, and wherein the weight ratio of said zinc oxide to said compound (b) is in the approximate range of 10:1 to 1:3.2 and the weight ratio of said zinc oxide to said compound (c) is in the approximate range of 10:1 to 1:2.

4,076,690

PHOSPHONATES, PROCESS FOR THEIR MANUFACTURE AND ORGANIC MATERIALS STABILIZED THEREWITH

Siegfried Rosenberger, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

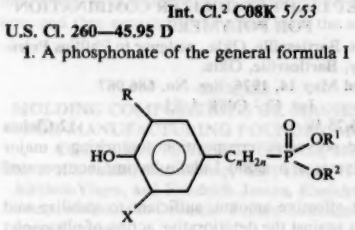
Filed Mar. 4, 1976, Ser. No. 663,953

Claims priority, application Switzerland, Mar. 10, 1975, 3001/75

Int. Cl.² C08K 5/53

U.S. Cl. 260—45.95 D **19 Claims**

1. A phosphonate of the general formula I



(I)

wherein

X represents chlorine,

R represents a linear or branched alkyl radical of 1 to 18 carbon atoms, a cycloalkyl radical of 5 to 8 carbon atoms or an aralkyl radical of 7 to 9 carbon atoms,

R^1 represents an alkyl radical of 1 to 22 carbon atoms, a cycloalkyl radical of 5 to 7 carbon atoms, or phenyl or benzyl which is unsubstituted or substituted by alkyl,

R^2 independently has the same meaning as R^1 or represents a hydrogen atom, and

n is 0, or 1, 2 or 3.

17. A mixture consisting of an organic material which is sensitive to degradation induced by heat and oxygen and of 0.005 to 5 percent by weight of a phosphonate of the formula I according to claim 1.

4,076,691

POLYACRYLATES CONTAINING PRIMARY AMINO GROUPS

Otto Wichterle, and Jiri Coupek, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

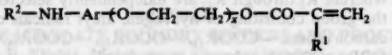
Continuation-in-part of Ser. No. 383,044, July 27, 1973, abandoned. This application Nov. 29, 1976, Ser. No. 745,967

Claims priority, application Czechoslovakia, Aug. 18, 1972, 5741-72

Int. Cl.² C08F 6/06, 8/12, 12/08, 26/02

U.S. Cl. 260—47 UA **19 Claims**

1. A method of producing a polymeric material containing primary amino groups, which comprises copolymerizing (a) a monomer having the general formula:



wherein

R^1 is selected from the group consisting of H and CH_3,

Ar is a bifunctional aromatic residue,

R^2 is an acyl group, and

x is 1 to 20,

and (b) an amount of a comonomer which is 2 to 30 times greater than the amount of said monomer by weight, said comonomer being selected from the group consisting of a hydroxyalkyl ester of acrylic acid, a hydroxyalkyl ester of methacrylic acid, an amide of acrylic acid, an amide of methacrylic acid, and styrene, the copolymerization being conducted at a temperature of 60° to 90° C; and treating the resulting copolymeric material at a temperature of 75° – 100° C. with a hydrolytic agent selected from the group consisting of a strong mineral acid and a strong mineral base to convert the acylamino groups into primary amino groups.

4,076,692

PROCESS FOR MANUFACTURING NOVALOID FIBER

Howard Dean Batha, and Glenn John Hazelet, both of Tonawanda, N.Y., assignors to American Kynol, Inc., Altamonte Springs, Fla.

Filed Jul. 15, 1976, Ser. No. 705,383

Int. Cl.² C08G 8/28

U.S. Cl. 260—59 R **12 Claims**

1. A process for forming cured novoloid fibers comprising:

a. blending uncured novolac resin with from about 3 to about 12 weight percent of a novolac cross-linking agent selected from the group consisting of hexamethylenetetramine and paraformaldehyde at a temperature below the curing temperature of the resulting blend;

b. melting the resulting blend at a temperature of from about 125 to about 500° C;

c. fiberizing said melted blend before it cures to an extent which prevents such fiberizing; and

d. curing the resulting uncured fibers by contacting them with an acidic gas at from about 20° to about 300° C and from about 1 to about 10 atmospheres of pressure for a curing time to obtain the desired degree of curing.

4,076,693

TEREPHTHALIC ACID/P,P-SULFONYLDIBENZOIC ACID/ETHYLENE GLYCOL/NEOPENTYL GLYCOL POLYESTER COMPOSITIONS AND CONTAINERS MADE THEREFROM

Santos W. Go, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

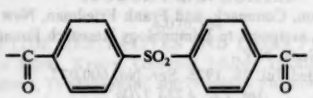
Filed Dec. 22, 1975, Ser. No. 643,282

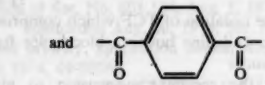
Int. Cl.² C08G 63/68

U.S. Cl. 260—75 S **3 Claims**

1. A linear copolyester which can be melted and molded to

a clear container, the repeating units of said polyester consisting essentially of


(a)


(b)

and —O—CH_2—CH_2—O— (c)

and —O—CH_2—$C(CH_3)_2$—CH_2—O— , (d)

said polyester having an oxygen permeability of less than 15 cc.mil/100 $in.^2$-day-atm. and a glass transition temperature in excess of 72° C., said (a) and (b) units and said (c) and (d) units respectively being the units formed by reactively combining polyester forming precursors thereof in an amount of at least one mole of the precursors of said (c) and (d) units per mole of precursors of said (a) and (b) units and wherein the precursors of said units in forming said polyester by said reactive combining are in a molar ratio of said (b) unit precursor to said (a) unit precursor of about 90:10 to about 40:60 and a molar ratio of said (c) unit precursor to said (d) unit precursor of about 80:20.

4,076,694

PROCESS FOR THE PRODUCTION OF POLYCONDENSATES CONTAINING IMIDE GROUPS

Wilfried Zecher; Werner Clarenz, and Rudolf Merten, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Jul. 27, 1976, Ser. No. 708,943

Claims priority, application Germany, Aug. 7, 1975, 2535335

Int. Cl.² C08G *18/30, 18/80;* **C08K** *5/20, 5/34*

U.S. Cl. 260—77.5 MA **6 Claims**

1. A product produced by the process of polycondensing at a temperature of from 0° to 450° C a mixture containing an organic polyisocyanate or masked polyisocyanate, a carboxylic acid cyclic anhydride substituted by at least one further cyclic anhydride group, a carboxyl group, an ester group or an SO_3H group and a monohydroxyalkyl ether, the relative proportions of the organic polyisocyanate or masked polyisocyanate and the substituted carboxylic acid cyclic anhydride being selected so that the reactive groups are present in equivalent amounts or up to an excess of 10% thereof and the monohydroxyalkyl ether being present in an amount of from 0.1 to 40% gram equivalents per gram equivalent of isocyanate.

4,076,695

SILICONE CONTAINING REACTION INJECTION MOLDED POLYURETHANES

Joseph W. Keil, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Feb. 7, 1977, Ser. No. 766,176

Int. Cl.² C08G *18/30*

U.S. Cl. 260—77.5 AM **10 Claims**

1. In a process of reaction injection molding of polyurethanes which include the mixing of one or more of each of polyols, polyisocyanates and catalysts, the reaction of the foregoing ingredients, and the molding and curing of the foregoing mixture into the desired configuration, the improvement comprising mixing with the other ingredients a carboxy functional siloxane.

4,076,696

EXTRUSION OF POLYPYRROLIDONE

James D. Neafsey, Annapolis, Md., assignor to Chevron Research Company, San Francisco, Calif.

Filed Dec. 9, 1976, Ser. No. 749,121

Int. Cl.² C08G *20/16*

U.S. Cl. 260—78 P **10 Claims**

1. A process of melt extruding normally solid poly-2-pyrrolidone comprising the steps of admixing with said poly-2-pyrrolidone a C_2–C_{30} alkylamine to form a composition comprising a minor amount of said alkylamine, and extruding said composition at a melt temperature in the range of 260°–280° C.

4,076,697

PROCESS FOR THE MANUFACTURE OF POLYADDITION PRODUCTS CONTAINING IMIDE GROUPS

Imre Forgó, Birsfelden; Alfred Renner, Munchenstein, both of Switzerland, and André Schmitter, Hegenheim, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

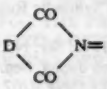
Filed Dec. 18, 1974, Ser. No. 534,106

Claims priority, application Switzerland, Dec. 21, 1973, 18049/73; Dec. 21, 1973, 18050/73

Int. Cl.² C08G *73/12*

U.S. Cl. 260—78 UA **34 Claims**

1. Process for the manufacture of a polyaddition product containing imide groups, said process consisting essentially of reacting a polyimide which contains, per molecule, at least two radicals of the general formula


(I)

in which D denotes a divalent radical containing a carbon-carbon double bond, with a saturated aliphatic polycarboxylic acid in the presence of a di-, tri- or tetra-primary amine with 2 to 40 carbon atoms or a primary polyamine obtained by reaction of a primary aromatic amine with an aldehyde or ketone, said primary polyamine being employed in such a ratio as to provide, per 1 equivalent of polyimide, such an amount of polycarboxylic acid and primary polyamine that the sum of the equivalents of said polycarboxylic acid and said polyamine is 0.3 to 1.5 equivalents and the equivalent ratio of said polycarboxylic acid to said polyamine is 1:1 to 4:1, at temperatures between 50° and 280° C to provide a polyaddition product in which said polycarboxylic acid forms a part.

4,076,698

HYDROCARBON INTERPOLYMER COMPOSITIONS

Arthur William Anderson, Wilmington, and Gelu Stoeff Stamatoff, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 568,707, March 1, 1956, abandoned. This application Jan. 4, 1957, Ser. No. 632,416

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² C08F *210/14, 210/16*

U.S. Cl. 260—88.2 F **15 Claims**

1. An interpolymer composed of interpolymerized comonomers consisting essentially of ethylene and at least one normal aliphatic mono-alpha-olefinic hydrocarbon containing from 5 to 10 carbon atoms per molecule, the proportion of said monoolefinic hydrocarbon being from 3 to 7% of the weight of the interpolymer, said interpolymer having a melt index within the range of 0.3 to 20, and, when in the form of a film, an Elmendorf tear strength in the range of 150 to 400 grams per mil, and a density of 0.93 to 0.94.

4,076,699

ALKALI SALTS OF A SULPHONATED STYRENE POLYMER OR COPOLYMER AS FLUIDIZING AGENTS AND A PROCESS FOR PREPARING THE SAME

Edouard Grimaud, Saint Genis Laval, and Robert Koeppel, Bron, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Oct. 10, 1975, Ser. No. 621,353
Claims priority, application France, Oct. 16, 1974, 74 34731
Int. Cl.[2] C04B *7/02;* C08G *75/18*
U.S. Cl. 260—79.5 C 9 Claims

1. A process for the manufacture of alkali salts of a sulphonated polystyrene polymer or copolymer which comprises:

a. telomerizing a styrene monomer to a degree a polymerization of less than about 140;

b. sulphonating the resulting polymer by means of an acid sulphonating agent, said sulphonation being carried out in two stages which comprises reacting in a first stage the styrene polymer with a portion less than all of the acid sulphonating agent at ambient temperature and then adding the balance of the acid sulphonating agent in a second stage at a temperature of from about 40° C to about 50° C; and

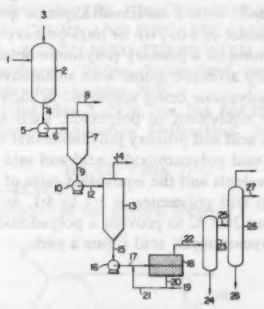
c. neutralizing the resulting sulphonic acid with an alkaline liquor.

4,076,700

PROCESS FOR RECOVERING HIGH PURITY FATTY ACIDS AND/OR ROSIN ACID AND STEROLS

Tetsuya Harada, Tokyo, and Tunemasa Yumoto, Chiba, both of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1976, Ser. No. 723,996
Claims priority, application Japan, Sep. 22, 1975, 50-114492
Int. Cl.[2] C09F *8/07*
U.S. Cl. 260—97.6 7 Claims



1. A process for recovering isomerized fatty acids and/or rosin acid in high purity, comprising: introducing a tall oil skimming soap or a tall oil soap into a thin film evaporator equipped with a rake in which the clearance between the blade tips and the surrounding tube wall is zero or not more than 1 mm; heating the contents of said thin film evaporator at a temperature higher than the melting point of the soap contained therein to evaporate and remove water and low-boiling unsaponifiable matter; adding an alkali to the thus obtained crude soap in an amount of 1.2 to 3.5 times the amount required to saponify the saponifiables in said tall oil skimming soap or tall oil soap at 120° to 210° C over a period of 20 minutes to 3 hours, thereby simultaneously decomposing esters of rosin acid and fatty acids with sterols and other alcohols and isomerizing non-conjugated double bond containing fatty acids to conjugated fatty acids; and then subjecting the saponification product to acid decomposition and then to distillation to obtain the desired isomerized fatty acids and/or rosin acid.

4,076,701

TUMOR COMPLEMENT FRACTION RECOVERY METHOD AND PRODUCT

Lawrence Burton, Commack, and Frank Friedman, New York, both of N.Y., assignors to Immunology Research Foundation, Inc., Great Neck, N.Y.

Filed Jul. 29, 1975, Ser. No. 600,027
Int. Cl.[2] A23J *1/06*
U.S. Cl. 260—112 B 11 Claims

1. A process for the isolation of TCF which comprises:

(a) suspending in an alkaline buffer a blood clot from an animal having cancer

(b) homogenizing the resultant suspension to give an homogenizate

(c) centrifuging the resultant homogenizate at 5400 - 10,000g to get a first supernatant

(d) centrifuging the first supernatant at 5400 - 10,000g to give a second supernatant

(e) centrifuging the second supernatant at 20,000 - 25,000g to give a third supernatant

(f) centrifuging the third supernatant at 25,000 - 30,000g to give a first sediment

(g) suspending the first sediment in a highly alkaline medium and centrifuging at $22.5 - 30 \times 10^3$g to give a fourth supernatant

(h) titrating the fourth supernatant with an alkaline material to raise the pH to over 11 and centrifuging the resultant material at $35 - 42 \times 10^3$g giving a fifth supernatant

(i) heating the fifth supernatant to 55° - 60° C. and centrifuging the resultant colloidal polypeptide at $25 - 30 \times 10^3$g giving a sixth supernatant, and

(j) heating the sixth supernatant to 55° - 60° C. and cooling the resultant material to cause agglommeration of the resultant TCF particles.

4,076,702

DIPEPTIDE DERIVATIVES AND THEIR PRODUCTION

Kentaro Hirai, Kyoto; Teruyuki Ishiba, Takatsuki; Kazuyuki Sasakura, Tondabayashi, and Hirohiko Sugimoto, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 601,134, Aug. 1, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,265
Claims priority, application Japan, Aug. 6, 1974, 49-90565; Aug. 6, 1974, 49-90566
Int. Cl.[2] C07C *103/52*
U.S. Cl. 260—112.5 R 1 Claim

1. A process for preparing 2-o-chlorobenzoyl-4-chloro-N-methyl-N$^{\alpha}$-glycyl-glycinanilide which comprises reacting 2',5-dichloro-2-methylaminobenzophenone with phthalyl-glycyl-glycyl chloride in an inert solvent and subjecting the resultant 2-o-chlorobenzoyl-4-chloro-N-methyl-N$^{\alpha}$-phthalyl-glycyl-glycinanilide to hydrazinolysis in an inert solvent.

4,076,703

DIPEPTIDE DERIVATIVES AND THEIR PRODUCTION

Kentaro Hirai, Kyoto; Teruyuki Ishiba, Takatsuki; Kazuyuki Sasakura, Tondabayashi, and Hirohiko Sugimoto, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 601,134, Aug. 1, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,266
Claims priority, application Japan, Aug. 6, 1974, 49-90565; Aug. 6, 1974, 49-90566
Int. Cl.[2] C07C *103/52*
U.S. Cl. 260—112.5 R 1 Claim

1. A process for preparing 2-o-chlorobenzoyl-4-chloro-N-methyl-N$^{\alpha}$-glycyl-glycinanilide which comprises (1) reacting 2',5-dichloro-2-methylaminobenzhydrol with phthalylglycylglycine in the presence of thionyl chloride in an inert solvent; (2) oxidizing the resultant 2-o-chloro-α-hydroxy-benzyl-4-chloro-N-methyl-N-phthalylglycyl-glycinanilide with Jones' reagent in an inert solvent; and (3) subjecting the resultant 2-o-chloro-

benzoyl-4-chloro-N-methyl-N^a-phthalylglycyl-glycinanilide to hydrazinolysis in an inert solvent.

4,076,704

DIPEPTIDE DERIVATIVES AND THEIR PRODUCTION

Kentaro Hirai, Kyoto; Teruyuki Ishiba, Takatsuki; Kazuyuki Sasakura, Tondabayashi, and Hirohiko Sugimoto, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 601,134, Aug. 1, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,267

Claims priority, application Japan, Aug. 6, 1974, 49-90565; Aug. 6, 1974, 49-90566

Int. Cl.^{2} C07C *103/52*

U.S. Cl. 260—112.5 R 1 Claim

1. A process for preparing 2-o-chlorobenzoyl-4-chloro-N-methyl-N^a-glycyl-glycinanilide which comprises reacting 1-methyl-2-aminomethyl-3-o-chlorophenyl-5-chloroindole with phthalyl-glycyl chloride in an inert solvent, oxidizing the resultant 1-methyl-2-(N^a-phthalyl-glycylaminomethyl)-3-o-chlorophenyl-5-chloroindole with chromic anhydride/acetic acid and subjecting the resultant 2-o-chlorobenzoyl-4-chloro-N-methyl-N^a-phthalylglycyl-glycinanilide to hydrazinolysis in an inert solvent.

4,076,705

DIPEPTIDE DERIVATIVES AND THEIR PRODUCTION

Kentaro Hirai, Kyoto; Teruyuki Ishiba, Takatsuki; Kazuyuki Sasakura, Tondabayashi, and Hirohiko Sugimoto, Ikeda, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Division of Ser. No. 601,134, Aug. 1, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,268

Claims priority, application Japan, Aug. 6, 1974, 49-90565; Aug. 6, 1974, 49-90566

Int. Cl.^{2} C07C *103/52*

U.S. Cl. 260—112.5 R 1 Claim

1. A process for preparaing 2-o-chlorobenzoyl-4-chloro-N-methyl-N^a-glycyl-glycinanilide which comprises reacting 2-o-chlorobenzoyl-4-chloro-N-methyl-glycinanilide in the form of acid addition salt thereof with phthalyl-glycyl chloride in an inert solvent and subjecting the resultant 2-o-chloro-benzoyl-4-chloro-N-methyl-N^a-phthalylglycyl-glycinanilide to hydrazinolysis in an inert solvent.

4,076,706

DISPERSE DYES FROM 2-CYANO-4,6-DINITROANILINE AND SELECTED 2(2'-ALKOXY-5'-ACYLAMIDOANILINO)ALKANES

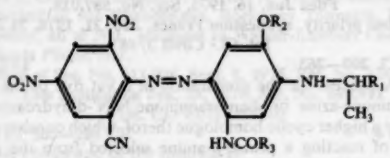
Gary T. Clark, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,906

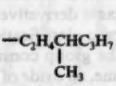
Int. Cl.^{2} C09B *29/26;* D06P *1/18, 3/54*

U.S. Cl. 260—207 7 Claims

1. A compound of the formula



wherein R_1 is straight chain alkyl of 4–10 carbons or the group



and R_2 and R_3 are selected from straight or branched alkyl of 1–4 carbons.

4,076,707

N-(2-HEXAMETHYLENIMINOETHYL)-5H-DIBENZ[b,f]-AZEPINE-5-CARBOXAMIDES AND QUATERNARY AMMONIUM DERIVATIVES THEREOF

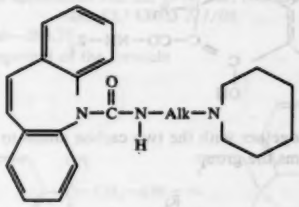
Peter K. Yonan, Morton Grove, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 492,454, Jul. 29, 1974, abandoned. This application May 24, 1976, Ser. No. 689,446

Int. Cl.^{2} G07D *223/26;* A61K *31/55*

U.S. Cl. 260—239 D 6 Claims

1. A member selected from the group consisting of compounds of the formula



wherein Alk is lower alkylene separating the nitrogen atoms attached thereto by at least 2 carbon atoms; and the pharmaceutically acceptable acid addition and lower alkyl halide having 1 to 6 carbon atoms quaternary ammonium salts thereof.

4,076,708

PROCESS FOR THE PREPARATION OF 7α-HALOGENO-3-OXO-4-DEHYDRO STEROIDS AND NOVEL 7α-HALOGENO DERIVATIVES PRODUCED THEREBY

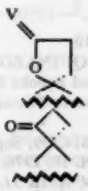
Michael J. Green, Kendall Park; Ho-Jane Shue, Belleville; Elliot L. Shapiro, Cedar Grove, and Margaret A. Gentles, Bloomfield, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Dec. 22, 1976, Ser. No. 753,257

Int. Cl.^{2} C07J *71/00*

U.S. Cl. 260—239.57 18 Claims

1. The process for the preparation and isolation of a 3-oxo-6,9-di-unsubstituted-7α-halogeno-4-dehydro steroid of the pregnane and androstane-17-spirolactone series wherein said halogen has an atomic weight greater than 20, and wherein said 17-spirolactone is defined by one of following formula I and II:



I

II

V being oxygen or hydrogen;

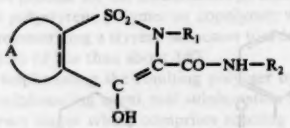
which comprises the reaction of a 3-oxo-6,7,9-triunsubstituted-4,6-bis-dehydro steroid of the pregnane and androstane-17-spirolactone series with at least an equimolar quantity of the corresponding hydrogen halide in a non-reactive, organic solvent at temperatures no higher than about 30° C and thence isolation of the 3-oxo-6-unsubstituted-7α-halogeno-4-dehydro steroid thereby formed at temperatures no higher than about 25° C by removing any excess acid and said solvent without subjecting said 3-oxo-6,9-di-unsubstituted-7α-halogeno-4-dehydro steroid to a basic medium, so as to obtain said 3-oxo-6,9-di-unsubstituted-7α-halogeno-4-dehydro steroid substantially free of acid or base.

4,076,709
THIENOTHIAZINES

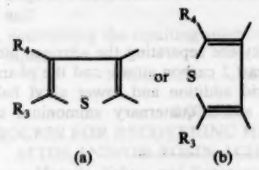
Otto Hromatka; Dieter Binder, both of Vienna, Austria; Rudolf Pfister, Basel, and Paul Zeller, Allschwil, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 21, 1975, Ser. No. 606,563
Claims priority, application Switzerland, Aug. 26, 1974, 11582/74; Sep. 19, 1974, 12157/74; Jul. 9, 1975, 8963/75
Int. Cl.² C07D *513/04*
U.S. Cl. 544—48 8 Claims

1. A compound of the formula



wherein A together with the two carbon atoms to which it is attached forms the group



(a) (b)

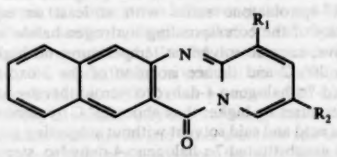
and the broken line represents the double bond present in group (a); R_1 represents a lower alkyl group; R_2 is selected from the group consisting of a 2-thiazolyl, 4-methyl-2-thiazolyl, 4,5-dimethyl-2-thiazolyl, 5-methyl-1,3,4-thiadiazolyl, 2-pyrazinyl, 2-pyrimidinyl, 1,2,4-triazin-3-yl, 2-pyridyl, 3-pyridyl, 4-pyridyl, 3-methyl-2-pyridyl, 4-methyl-2-pyridyl, 5-methyl-2-pyridyl, 6-methyl-2-pyridyl, 4,6-dimethyl-2-pyridyl, 5-isoxazolyl, 5-methyl-3-isoxazolyl, 3,4-dimethyl-5-isoxazolyl, 2,6-dimethyl-4-pyrimidinyl and 6-methyl-2-pyridyl group or a phenyl group which may be substituted by halogen, hydroxy, lower alkyl, trifluoromethyl or lower alkoxy; and R_3 and R_4 each represent a hydrogen atom or a lower alkyl group.

4,076,710
BENZO[g]PYRIDO[2,1-b]-QUINAZOLINONES

Charles F. Schwender, Lebanon, and Brooks R. Sunday, Hackettstown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 614,399, Sep. 18, 1975, Pat. No. 4,012,387. This application Oct. 18, 1976, Ser. No. 733,602
Int. Cl.² C07D *471/04*; A61K *31/505*
U.S. Cl. 260—256.4 F 3 Claims

1. A compound of the structure:



wherein R_1 and R_2 are selected from the group consisting of hydrogen and tetrazolyl with the proviso that R_1 and R_2 are not identical and its pharmaceutically acceptable salts.

4,076,711
TRIAZOLO [4,5-d]-PYRIMIDINES

Ashit K. Ganguly, Upper Montclair, N.J.; Edwin A. Peets, New York, N.Y., and Anil K. Saksena, Upper Montclair, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 673,785, Apr. 5, 1976, abandoned. This application Dec. 22, 1976, Ser. No. 753,205
Int. Cl.² A61K *31/41*; C07D *487/04*
U.S. Cl. 260—256.4 F 6 Claims

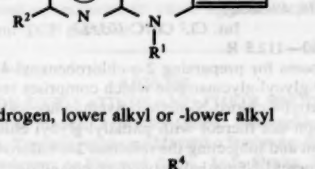
1. A compound selected from the group consisting of 7-chloro-3-cyclohexyl-3H-γ-triazolo[4,5-d]-pyrimidine,
7-chloro-3-cycloheptyl-3H-γ-triazolo[4,5-d]-pyrimidine,
7-chloro-3-cyclobutyl-3H-γ-triazolo[4,5-d]-pyrimidine,
7-iodo-3-cyclohexyl-3H-γ-triazolo[4,5-d]-pyrimidine, and
7-methoxy-3-cyclopentyl-3H-γ-triazolo[4,5-d]-pyrimidine.

4,076,712
DERIVATIVES OF PYRAZOLO[1,5-a]PYRIDO[2,3-d]PYRIMIDIN-9(4H)-ONE

Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

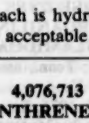
Filed Mar. 31, 1977, Ser. No. 783,253
Int. Cl.² C07D *471/14*; A61K *31/415*
U.S. Cl. 260—256.4 F 12 Claims

1. A compound of the formula



wherein

R^1 is hydrogen, lower alkyl or -lower alkyl



R^2, R^3, R^4 and R^5 each is hydrogen or lower alkyl; and salts physiologically acceptable thereof.

4,076,713
INDANTHRENE DYES

Jean Claude Henri Raoul Hardouin, Chantilly, and Maurice René Jean Vallette, Precy sur Oise, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jun. 16, 1975, Ser. No. 587,018
Claims priority, application France, Jun. 21, 1974, 74 21585
Int. Cl.² C09B *5/48*
U.S. Cl. 260—263 13 Claims

1. A process for the preparation of a vat dye of the dianthraquinone-azine or dianthraquinone-N,N'-dihydroazine series, or a higher cyclic homologue therof, which consists essentially of reacting a primary amine selected from the group consisting of amino anthraquinones, their substitution products and higher cyclic homologues, with an alkaline condensing agent, wherein the reaction is effected in the presence of at least one oxide of an organic derivative of a metalloid element of group 5B of the periodic classification of the elements and which is selected from the group consisting of an oxide of an aliphatic or aromatic amine, an oxide of a heterocyclic nitrogenous base, alkylphosphine oxide, arylphosphine oxide, alkylaminophosphine oxide, alkylarylaminophosphine oxide and an arsine oxide, and wherein said oxide is present in sufficient quantity for the reaction.

4,076,714
1-METHYL-4-(2-CARBOXY-THIOXANTHEN-9-YLIDENE)-PIPERIDINE AN APPETITE STIMULANT AND ANTIHISTAMINIC AGENT

Paul S. Anderson, Lansdale, and David C. Remy, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 526,483, Nov. 25, 1974, abandoned. This application Oct. 29, 1975, Ser. No. 626,899
Int. Cl.[2] A61K *31/445;* C07D *211/06, 275/00*
U.S. Cl. 424—267 3 Claims

1. 1-Methyl-4-(2-carboxy-thioxanthen-9-ylidene)-piperidine or a nontoxic pharmaceutically acceptable salt thereof.

2. A method of treatment of histaminically induced allergies which comprises administering to a patient in need of such treatment an effective amount of 1-methyl-4-(2-carboxy-thioxanthen-9-ylidene)-piperidine or a nontoxic pharmaceutically acceptable salt thereof.

3. A pharmaceutical composition in unit dosage form comprising an appetite stimulant or antihistaminic effective amount of 1-methyl-4-(2-carboxy-thioxanthen-9-ylidene)-piperidine or a nontoxic pharmaceutically acceptable salt thereof and a pharmaceutical carrier therefor.

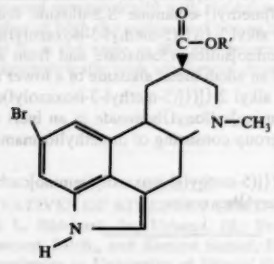
4,076,715
13-BROMO LYSERGIC ACID COMPOUNDS

Theodor Fehr, Dornach, and Hartmut Hauth, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Division of Ser. No. 399,167, Sep. 20, 1973, Pat. No. 3,901,891. This application May 23, 1975, Ser. No. 580,362
Claims priority, application Switzerland, Sep. 26, 1972, 14032/72; Sep. 26, 1972, 14033/72
Int. Cl.[2] C07D *457/04;* A61K *31/48*
U.S. Cl. 260—285.5 6 Claims

1. A compound of the formula,

VIII



wherein R′ is alkyl of 1 to 6 carbon atoms or hydrogen.

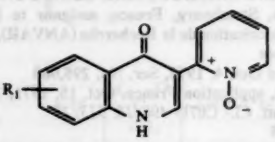
4,076,716
SUBSTITUTED 3-(2-PYRIDINYL)-4(1H)-QUINOLINONE N-OXIDES

David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximilian von Strandtmann, Rockaway Township, Morris County, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 611,036, Sept. 8, 1975, Pat. No. 4,007,193. This application Jun. 25, 1976, Ser. No. 699,911
Int. Cl.[2] C07D *401/04*
U.S. Cl. 260—288 CE 4 Claims

1. A compound of the formula II:

II



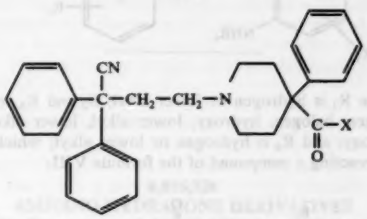
wherein R_1 is hydrogen, halogen, lower-alkyl of 1 to 7 carbon atoms, hydroxy or alkoxy of 1 to 7 carbon atoms; and the pharmaceutically acceptable acid addition salts thereof.

4,076,717
DERIVATIVES OF 1-(3-CYANO-3,3-DIPHENYLPROPYL)-4-PHENYL-PIPERIDINE-4-CARBOXYLIC ACID

Eunice M. Kreider, Chicago, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 208,445, Dec. 15, 1971, Pat. No. 3,843,646. This application Jul. 22, 1974, Ser. No. 490,765
Int. Cl.[2] C07D *211/06*
U.S. Cl. 260—293.75 4 Claims

1. A compound of the formula



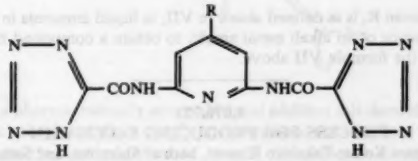
and the non-toxic pharmaceutically acceptable acid addition salts thereof, wherein X is 2-pyridylmethyloxy, 4-chlorophenylcarboxy, and 3-methyl-(4-methylthio)phenyloxy.

4,076,718
2,6-PYRIDINEDIYL-BIS-TETRAZOL-5-CARBOXAMIDES

John H. Sellstedt, Pottstown, and Dieter H. Klaubert, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Jan. 21, 1977, Ser. No. 761,150
Int. Cl.[2] C07D *401/14;* A61K *31/455*
U.S. Cl. 260—295 PA 5 Claims

1. A compound of the formula:



in which
R is hydrogen, halo or lower alkoxy,
or a pharmaceutically acceptable salt thereof.

4,076,719
SUBSTITUTED PYRIDINYL METHOXY (OR 1-METHYL METHOXY)BENZENEAMINES

Alin H. Gulbenk, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 622,195, Oct. 14, 1975, Pat. No. 4,003,906, which is a division of Ser. No. 435,608, Jan. 22, 1974, Pat. No. 3,931,200. This application Oct. 22, 1976, Ser. No. 734,896
Int. Cl.[2] C07D *213/36*
U.S. Cl. 260—296 R 1 Claim

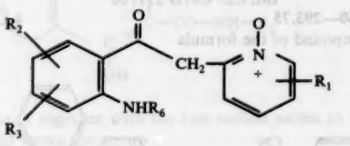
1. The compound which is 4-((3,6-dichloro-2-pyridyl)methoxy)benzeneamine.

4,076,720
1-SUBSTITUTED-2-(2-PYRIDINYL)ETHANONE N-OXIDES

David T. Connor, Parsippany; Patricia A. Young, Madison, and Maximilian von Strandtmann, Rockaway Township, Morris County, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

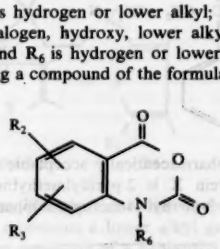
Division of Ser. No. 611,282, Sep. 8, 1975. This application Jan. 25, 1977, Ser. No. 762,549
Int. Cl.[2] C07D *213/50*
U.S. Cl. 260—296 R 1 Claim

1. A process for preparing a compound of the formula VII:



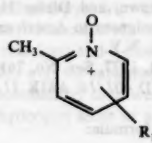
VII

wherein R_1 is hydrogen or lower alkyl; R_2 and R_3 are each hydrogen, halogen, hydroxy, lower alkyl, lower alkoxy or benzyloxy; and R_6 is hydrogen or lower alkyl; which comprises reacting a compound of the formula VIII:



VIII

wherein R_2, R_3 and R_6 are as defined above in VII with a substituted 2-picoline N-oxide of the formula V:



V

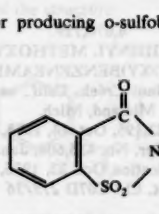
wherein R_1 is as defined above in VII, in liquid ammonia in the presence of an alkali metal amide, to obtain a compound having the formula VII above.

4,076,721
PROCESS FOR PRODUCING SACCHARIN

Wataro Koike; Takahiro Kimoto, both of Shizuoka, and Sadayoshi Matsui, Shimizu, all of Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

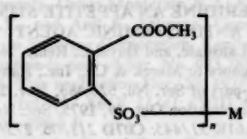
Filed Apr. 15, 1976, Ser. No. 677,255
Claims priority, application Japan, Feb. 7, 1976, 51-12461; Jun. 11, 1975, 50-70311
Int. Cl.[2] C07D *275/06*
U.S. Cl. 260—301 11 Claims

1. A process for producing o-sulfobenzimide having the formula:



which comprises:

reacting phosgene with a methylbenzoate-o-sulfonate having the formula:



(I)

wherein M represents potassium or calcium, n is 1 when M is K and n is 2 when M is Ca, in an inert organic solvent in the presence of dimethylformamide;

reacting ammonia with the reaction product to form the ammonium salt of said o-sulfobenzimide; and

converting said ammonium salt to said o-sulfobenzimide.

4,076,722
COMPOSITION CONTAINING ALKYL 2-{[({[(5-METHYL-3-ISOXAZOLYL)-AMINO]CARBONYL}METHYL)AMINO]SULFONYL}BENZOATE AND AN ALKALI METAL ALKOXIDE OF A LOWER ALCOHOL IN AN INERT SOLVENT

Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 577,567, May 21, 1975, Pat. No. 3,987,038. This application Feb. 10, 1976, Ser. No. 657,007
Int. Cl.[2] C07D *261/14*
U.S. Cl. 260—307 H 4 Claims

1. A composition which is a reaction mixture suitable for the preparation of 1-{[5-(4-hydroxy-2H-1,2-benzothiazin-3-yl)-1,2,4-oxadiazol-3-yl]methyl}-ethanone S,S-dioxide consisting essentially of lower alkyl 2-{[({[(5-methyl-3-isoxazolyl)amino]-carbonyl}methyl)amino]sulfonyl}benzoate and from about 2 to about 5 moles of an alkali metal alkoxide of a lower alcohol per mole of lower alkyl 2-{[({[(5-methyl-3-isoxazolyl)amino]-carbonyl}methyl)amino]sulfonyl}benzoate in an inert solvent selected from the group consisting of dimethylformamide and dimethyl sulfoxide.

4. Methyl 2-{[({[(5-methyl-3-isoxazolyl)amino]carbonyl}• methyl)amino]sulfonyl}benzoate.

4,076,723
CERTAIN DIBENZOTHIACYCLIC-S-OXIMIDES

Peter Stoss, Wildtal, and Gerhard Satzinger, Denzlingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 663,312, Mar. 3, 1976, Pat. No. 4,033,981, which is a division of Ser. No. 496,600, Mar. 3, 1975, Pat. No. 3,978,052. This application Feb. 17, 1977, Ser. No. 769,641
Claims priority, application Germany, Aug. 17, 1973, 2341653
Int. Cl.[2] C07D *337/14, 335/12, 335/16*
U.S. Cl. 260—327 B 4 Claims

1. Dibenzothiophene-S-oximide.

4,076,724
POLYCYCLIC MACROCYCLIC COMPOUNDS

Jean-Marie Lehn, Strasbourg, France, assignor to L'Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Oct. 4, 1972, Ser. No. 295,083
Claims priority, application France, Oct. 15, 1971, 71.37116
Int. Cl.[2] C07D *498/18, 513/18*
U.S. Cl. 260—338 9 Claims

1. A polycyclic macrocyclic compound selected from the group consisting of a compound of the following formula I:

I

wherein each R is a bridging chain having not more than twelve directly connecting atoms between the two nitrogen atoms to which it is attached and having a saturated carbon atom directly connected to each of said nitrogen atoms, R being a member selected from the group consisting of a hydrocarbon radical having from 2 to 24 carbon atoms, and a radical defined by following formula II:

$$-A-(D-A)_n- \qquad II$$

wherein n is an integer from 1 to 3, each A may be the same or different and is a hydrocarbon having from 2 to 12 carbon atoms; and each D is a member selected from the group consisting of oxygen, sulfur, and =N—R′, R′ being a member selected from the group consisting of hydrogen, a hydrocarbon radical selected from the group consisting of a straight and branched alkyl group having from 1 to 8 carbon atoms and a straight and branched alkenyl group having from 2 to 8 carbon atoms, and a hydrocarbonsulfonyl radical having up to twelve carbon atoms, each D may be the same only when D is oxygen, or sulfur; ech of said R chains may be the same or different with the proviso that at least two of said R chains are defined by formula II and when R_5 and R_6 are defined by formula II, the integer n is 1; and with the proviso that the number of both the carbon and hetero directly connecting atoms in R_2, R_3 and R_4 is the same as in R_1, and all the hetero atoms in R_2, R_3 and R_4 are spaced symmetrically with the hetero atoms in R_1; and the number of both the carbon and hetero directly connecting atoms in R_5 is the same as R_6, any hetero atom in R_6 being spaced symmetrically with any hetero atom in R_5.

4,076,725

DERIVATIVES OF STREPTOVARICIN ANSAMYCINS

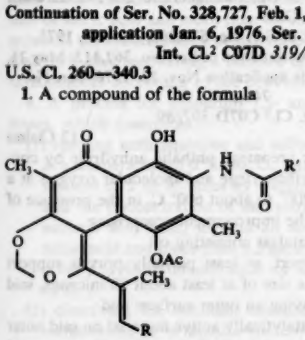
Kenneth L. Rinehart, Jr., Urbana, Ill.; Frederick J. Antosz, Kalamazoo, Mich., and Kazuya Sasaki, Higashikurume, Japan, assignors to University of Illinois Foundation, Urbana, Ill.

Continuation of Ser. No. 328,727, Feb. 1, 1973, abandoned. This application Jan. 6, 1976, Ser. No. 646,966

Int. Cl.² C07D *319/08*

U.S. Cl. 260—340.3 **50 Claims**

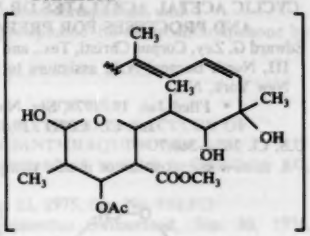
1. A compound of the formula



wherein

R IS ; AND R′ IS

-continued



and Ac is an acyl residue of a C_2 to C_{18} carboxylic acid.

4,076,726

AMIDINO-HYDRAZONE DERIVATIVES

Harm Jan Panneman, and Antonius Hermanus Nicolaas Maria Bruins, both of Oss, Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

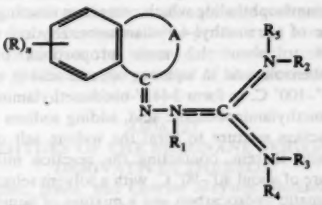
Filed May 21, 1975, Ser. No. 579,633

Claims priority, application Netherlands, Jun. 1, 1974, 7407469

Int. Cl.² C07C *123/00*; C07D *317/44*

U.S. Cl. 260—340.5 R **4 Claims**

1. A compound selected from the group consisting of a compound of the formula:



and a pharmaceutically acceptable acid addition salt thereof, in which the dotted lines signify one extra bond starting from the (guanidine-) carbon atom to one of the adjacent nitrogen atoms, and wherein

A is a member of the group consisting of methylene, ethylene propylene, and butylene, which groups may optionally be substituted with alkyl having 1 to 4 carbon atoms;

R is a member of the group consisting of hydroxy, alkyl having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, halogen, trifluoromethyl, nitro, amino, hydroxymethyl, acyloxy derived from a lower aliphatic carboxylic acid having 1 to 4 carbon atoms, and alkylenedioxy; n is the number 0, 1, 2, 3, or 4;

R_1, R_4 and R_5 are each a member of the group consisting of hydrogen and alkyl having 1 to 4 carbon atoms, with the proviso that one member is absent in view of the presence of the double bond; and

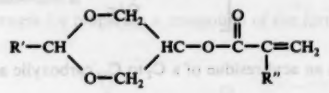
R_2 and R_3 is each a member of the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms, aralkyl, aryl, hydroxy and amino.

4,076,727
CYCLIC ACETAL ACRYLATES OR METHACRYLATES AND PROCESSES FOR PREPARING SAME

Edward G. Zey, Corpus Christi, Tex., and William A. Hoffmann, III, North Bergen, N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 650,214
Int. Cl.² C07D *319/04*
U.S. Cl. 260—340.7 5 Claims

1. A new composition of matter comprising:



wherein R′ is hydrogen, C_1–C_3 alkyl or C_1–C_3 halogenated alkyl, and R″ is hydrogen or methyl.

2. A process for preparing the composition of claim 1 which comprises:

a. reacting an aldehyde having the general formula

R′-CHO

wherein R′ is hydrogen, C_1–C_3 alkyl, or C_1–C_3 halogenated alkyl, with glycerine, at temperatures up to 150° C., and

b. esterifying the resulting product with acrylic acid or methacrylic acid at temperatures up to about 200° C.

4,076,728
PROCESS FOR MANUFACTURING CRYSTAL VIOLET LACTONE

Donald Roy Maulding, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 17, 1977, Ser. No. 778,399
Int. Cl.² C07D *307/88*
U.S. Cl. 260—343.4 8 Claims

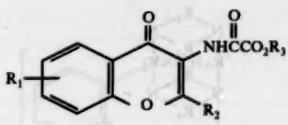
1. A process for preparing 3,3-bis(4-dimethylaminophenyl)-6-dimethylaminophthalide which comprises reacting one mole proportion of tetramethyl-4,4′-diaminobenzhydrol with from about 0.9 to about 1.2 mole proportions of 3-dimethylaminobenzoic acid in aqueous sulfuric acid at a temperature of 65°–100° C. to form 2-[4,4′-bis(dimethylamino)benzhydryl]-5-dimethylaminobenzoic acid, adding sodium hydroxide to the reaction mixture to form the sodium salt of the said benzoic acid therein, contacting the reaction mixture at a temperature of about 40°–90° C. with a solvent selected from a liquid aromatic hydrocarbon and a mixture of liquid aromatic hydrocarbon and a water-immiscible alkane, whereby impurities present in said solution are extracted therefrom; separating the organic extract phase from the aqueous reaction mixture phase, treating the reaction mixture phase with an inorganic oxidizing agent to oxidize the sodium salt of the 2-[4,4′-bis(-dimethylamino)benzhydryl]-5-dimethylaminobenzoic acid to the 3,3-bis-(4-dimethylaminophenyl)-6-dimethylaminophthalide product and recovering said product from the reaction mixture.

4,076,729
(4-OXO-4H-1-BENZOPYRAN-3-YL)AMINOOXOACETIC ACIDS AND THEIR DERIVATIVES

David T. Connor, Parsippany; Patricia A. Young, Madison, and Max von Strandtmann, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 2, 1976, Ser. No. 710,996
Int. Cl.² C07D *311/02, 311/72;* A61K *31/35, 31/355*
U.S. Cl. 260—345.2 9 Claims

1. A compound of the formula:



I

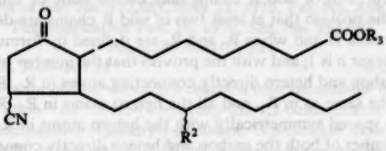
wherein R_1 is hydrogen, halogen, lower alkoxy or lower alkyl; R_2 is hydrogen or lower alkyl; R_3 is hydrogen or lower alkyl and the corresponding pharmaceutically acceptable salts thereof.

4,076,730
PROSTAGLANDIN DERIVATIVES

Donald P. Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 384,769, Aug. 1, 1973, Pat. No. 3,845,042, which is a continuation-in-part of Ser. No. 282,200, Aug. 21, 1972, abandoned. This application Aug. 2, 1974, Ser. No. 494,118
Int. Cl.² C07C *121/46;* C07D *309/22*
U.S. Cl. 260—345.7 P 1 Claim

1. A compound of the formula:



wherein R^2 is hydroxy, acetoxy or tetrahydropyranyloxy and R_3 is hydrogen or lower alkyl.

4,076,731
PROCESS FOR PREPARING PHTHALIC ANHYDRIDE

Serge R. Dolhyj, Parma; Ernest C. Milberger, Solon, and James F. White, Akron, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 572,260, Apr. 28, 1975, abandoned, which is a continuation of Ser. No. 362,412, May 21, 1973, abandoned. This application Nov. 12, 1976, Ser. No. 741,176
Int. Cl.² C07D *307/89*
U.S. Cl. 260—346.4 12 Claims

1. In the process for preparing phthalic anhydride by contacting a mixture of ortho-xylene and molecular oxygen at a temperature of about 200° to about 600° C. in the presence of an oxidation catalyst, the improvement comprising

using an oxidation catalyst consisting of:

a. an essentially inert, at least partially porous support having a particle size of at least about 20 microns, said inert support having an outer surface; and

b. a coating of a catalytically active material on said outer surface of said support which strongly adheres to said outer surface of said inert support, said catalytically active material containing boron, antimony or mixture thereof and an oxide of vanadium such that the weight of vanadium is less than 10% of the total weight of the oxidation catalyst, and wherein the active material optionally contains silica.

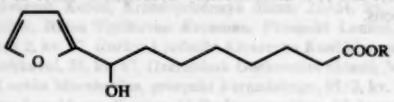
4,076,732

DERIVATIVES OF α-(6-CARBOXYHEXYL) FURFURYL ALCOHOL

Middleton Brawner Floyd, Jr., Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 30, 1977, Ser. No. 782,861
Int. Cl.[2] C07D *307/54*
U.S. Cl. 260—347.3 5 Claims

1. A compound of the formula:



wherein R is selected from the group consisting of hydrogen and C_1–C_6 alkyl.

4,076,733

PROCESS FOR THE PREPARATION OF FURFURAL

Stig Åke Dahlgren, Lidingo, Sweden, assignor to Carbos AG, Zurich, Switzerland

Filed Mar. 31, 1976, Ser. No. 672,296
Int. Cl.[2] C07D *307/50*
U.S. Cl. 260—347.9 13 Claims

1. A process for the preparation of furfural comprising subjecting a lactose-containing material essentially free of milk proteins to steam distillation under acidic conditions, whereby at least part of the lactose present is converted to furfural.

4,076,734

PROCESS FOR PREPARING DINITROANTHRAQUINONES

Eiji Yamada; Mutuo Yamada, both of Ibaraki, and Kazuyuki Nobuoka, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Oct. 4, 1972, Ser. No. 296,496
Claims priority, application Japan, Oct. 7, 1971, 46-79165; Oct. 29, 1971, 46-86644
Int. Cl.[2] C07C *79/37*
U.S. Cl. 260—369 5 Claims

1. A process for preparing 1,5- and 1,8-dinitroanthraquinones, which comprises reacting anthraquinone and sulfuric acid and nitric acid at a temperature of 0° to 50° C., nitric acid being used in an amount 3 to 30 times by weight that of anthraquinone, the concentration of said nitric acid not being lower than 96%, and sulfuric acid being used in an amount less than that of nitric acid and more than 0.5 mole per mole of anthraquinone, the concentration of said sulfuric acid not being lower than 98% and recovering a mixture of 1,5- and 1,8-dinitroanthraquinones according to the conventional procedure.

4. A process for preparing 1,5- and 1,8-dinitroanthraquinones, which comprises

(1) reacting anthraquinone and sulfuric acid and nitric acid at a temperature of 0° to 50° C., nitric acid being used in an amount of 3 to 30 times by weight that of anthraquinone and the concentration of said nitric acid being 96%, and sulfuric acid being used in an amount less than that of nitric acid and more than 0.5 mole per mole of anthraquinone and the concentration of said sulfuric acid being 98%.

(2) dissolving the resultant mixture in nitrobenzene or a nitrotoluene or a mixture thereof by heating to 170° to 230° C., the amount of nitrobenzene, a nitrotoluene of mixture thereof being 2 to 10 time the amount of the mixture from step (1),

(3) cooling the resulting solution to 100° to 160° C. to precipitate 1,5-dinitroanthraquinone,

(4) separating the precipitated 1,5-dinitroanthraquinone by hot filtration,

(5) cooling the filtrate obtained above to 10° to 70° C. to precipitate 1,8-dinitroanthraquinone, and

(6) separating the precipitated 1,8-dinitroanthraquinone by filtration.

4,076,735

PROCESS FOR THE MANUFACTURE OF AMINOANTHRAQUINONES

Zdenek Seha, Basel, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed Sep. 12, 1975, Ser. No. 612,811
Claims priority, application Switzerland, Sep. 20, 1974, 12793/74
Int. Cl.[2] C09B *1/16*
U.S. Cl. 260—378 4 Claims

1. A process for the manufacture of aminoanthraquinones, wherein mononitroanthraquinone or dinitroanthraquinone or mononitroanthraquinone or dinitroanthraquinone substituted by alkoxy, carboxyl, sulpho, hydroxy, amino or halogen, is reacted in dipolar aprotic solvents which contain —SO_2— or —SO— groups and are inert to the reactants, with aliphatic, aliphaticaromatic, cycloaliphatic, substituted or unsubstituted primary or secondary amines of the formulae R—NH_2 or R—R'—NH, in which R and R' are radicals that are the same or different alkyl, aralkyl, cycloalkyl, hydroxyalkyl radicals of 1 to 8 carbon atoms.

4,076,736

PREPARATION OF AMINOANTHRAQUINONES FROM NITROANTHRAQUINONES

Karl-Julius Reubke, Cologne, Germany; Hans-Samuel Bien, deceased, late of Burscheid, Germany (by Else Bien, nee Geriche, heiress); Gabriele Bien, and Dorothee Bien, both of Berscheid, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 4, 1976, Ser. No. 693,038
Claims priority, application Germany, Jun. 14, 1975, 2526651
Int. Cl.[2] C07C *87/67, 97/24*
U.S. Cl. 260—382 10 Claims

1. In the reaction of a nitroanthraquinone with ammonia in a solvent at elevated temperature to produce the corresponding aminoanthraquinone, the improvement which comprises effecting the reaction in the presence of an ammonium halide.

4,076,737

ALDEHYDES OF THE PREGNANE SERIES AND DERIVATIVES THEREOF

Georg Anner, Basel, and Charles Meystre, Reinach, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 551,482, Feb. 20, 1975, abandoned, which is a continuation-in-part of Ser. No. 447,791, Mar. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 883,326, Dec. 8, 1969, abandoned. This application Aug. 26, 1976, Ser. No. 717,854
Int. Cl.[2] C07J *17/00*
U.S. Cl. 260—397.45 4 Claims

1. A 20-acylate of the $\Delta^{1,4,17(20)}$-16α-methyl-6α,9α-difluoro-11β,20-dihydroxy-3,21-dioxo-pregnatriene, in which the acylate group is derived from a lower aliphatic carboxylic acid having from 1 to 7 carbon atoms.

4,076,738

POLYISOBUTYLENE OXIDATION PROCESS

Joseph Michael Pecoraro, Burlington, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 30, 1976, Ser. No. 701,748
Int. Cl.[2] C09F *7/02*
U.S. Cl. 260—406 2 Claims

1. A process for oxidizing polyisobutylene having an average molecular weight of about 300 to 3000 to form a polyisobu-

tylcarboxylic acid composition characterized by at least about 80% by weight of said composition being polyisobutylcarboxylic acid wherein substantially all carboxyl groups are attached to tertiary carbon atoms, the acid composition having no more than about 20% by weight of a nonacidic polyisobutyl component, said process comprising:

i. contacting the polyisobutylene in a liquid phase at a temperature of about −80° C to 60° C with 1 to 10% by weight of ozone in a carrier gas for a time sufficient to convert substantially all of the polyisobutylene to ozonized polyisobutylene, and

ii. contacting the ozonized polyisobutylene with aqueous nitric acid of specific gravity of about 1.18 to 1.48 at a temperature of about 20° C to 110° C for a time sufficient to convert substantially all of said ozonized polyisobutylene to said polyisobutylcarboxylic acid composition.

4,076,739

SYNTHESIS OF VITAMIN E

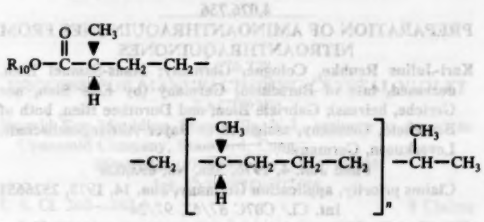
Ka-Kong Chan, Stanhope, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 587,570, Jun. 17, 1975, Pat. No. 4,016,178. This application Dec. 8, 1976, Ser. No. 747,111

Int. Cl.² C11C *1/00, 3/02*

U.S. Cl. 260—410.9 R **4 Claims**

1. A optical isomer of the formula:



where R_{10} is hydrogen or lower alkyl; n is an integer of from 0 to 1.

3. The compound of claim 1 wherein said compound is 2(R),6-dimethylheptanoic acid methyl ester.

4,076,740

PERFLUOROALKYLTHIO NORBORNANE COMPOUNDS

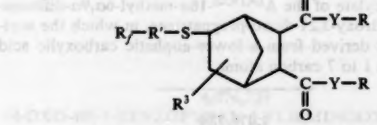
Neal O. Brace, Wheaton, Ill., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 608,932, Aug. 29, 1975, Pat. No. 3,989,725. This application Nov. 1, 1976, Ser. No. 737,463

Int. Cl.² C07C *153/11, 153/01*

U.S. Cl. 260—455 R **8 Claims**

1. A compound having the formula



wherein

Y is independently oxygen or sulfur provided that at least one Y is sulfur,

R′ is a divalent radical of the formula $-C_nH_{2n}-$, $-C_nH_{2n}-S-C_nH_{2n}-$, $-C_nH_{2n}-O-C_nH_{2n}-$ or

$-C_nH_{2n}-$, $-C_nH_{2n}-S-C_nH_{2n}-$,

-continued

$-C_nH_{2n}-O-C_nH_{2n}-$ or $-C_nH_{2n}-\underset{\displaystyle R^2}{N}-C_nH_{2n}$

where n is 1 to 12 and R^2 is hydrogen or alkyl of 1 to 6 carbon atoms, R_f is a straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substitited by a perfluoroalkoxy group of 2 to 6 carbon atoms, R^3 is hydrogen or methyl and R is independently hydrogen or alkyl of 1 to 24 carbons.

4,076,741

HERBICIDAL 4-TRIFLUOROMETHYL-4-NITRODIPHENYL ETHERS

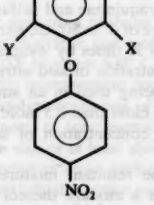
Horst O. Bayer, Levittown; Colin Swithenbank, Perkasie, and Roy Y. Yih, Doylestown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 234,656, March 14, 1972, Pat. No. 3,888,932. This application Feb. 12, 1973, Ser. No. 331,947

Int. Cl.² C07C *121/75, 43/20*

U.S. Cl. 260—465 F **7 Claims**

1. A compound of the formula



wherein

X is a hydrogen atom, a trifluoromethyl group, a (C_1–C_4) alkyl group, or a cyano group, and

Y is a hydrogen atom, a halogen atom, or a trifluoromethyl group, provided that when X is a hydrogen atom, Y is other than a halogen atom.

4,076,742

ANAEROBIC COMPOSITION COMPRISING OLIGOCARBONATEACRYLATES BENZOYL PEROXIDE AND FERROCENE

Alfred Anisimovich Berlin, Leninsky prospekt, 57, kv. 9, Moscow; Khaim-Mordkhe Aronovich Brikenshtein, p/o Chernogolovka, ulitsa, Vtoraya 5, kv. 1, Moskovskaya oblast, Noginsky raion; Nikolai Sviridovich Gavrjushenko, ulitsa Karla Marxa, 20, kv. 181, Moscow; Fedor Ivanovich Dubovitsky, Vorobievskoe shosse, 2, kv. 12, Moscow; Tamara Yakovlevna Kefeli, Krasnoprudnaya ulitsa, 22/24, kv. 103, Moscow; Raisa Vasilievna Kronman, Prospekt Lenina, 30, korpus 2, kv. 47, Gorky; Ljudmila Alexeevna Konkhina, ulitsa Tereshkovoi, 58, kv. 67, Dzerzhinsk Gorkovskoi oblasti; Natalya Lvovna Marshavina, prospekt Vernadskogo, 95/2, kv. 252; Galina Leonidovna Popova, 11 Parkovaya ulitsa, 44, korpus 3, kv. 39, both of Moscow; Anna Alexandrovna Radugina, p/o Chernogolovka, ultisa pervaya, 32, kv. 59, Moskovskaya oblast, Noginsky raion; Jury Mikhailovich Sivergin, Sobinovsky pereulok, 1, kv. 12, Moscow; Iosif Grigorievich Sumin, prospekt Lenina, 81, kv. 58, Dzerzhinsk Gorkovskoi oblasti; Nikolai Nikandrovich Tvorogov, Matveevskaya ulitsa, 10, korpus 2, kv. 22, Moscow; Galina Pavlovna Shilova, p/o Chernogolovka, ulitsa Pervaya, 2a, kv. 21, Moskovskaya oblast, Noginsky Raion, and David Alexeevich Kardashov, Frunzenskaya naberezhnaya, 52, kv. 57, Moscow, all of U.S.S.R.

Filed Jul. 14, 1975, Ser. No. 595,682
Int. Cl.² C08F *4/34, 18/24;* B01F *9/00*
U.S. Cl. 260—47 UA **4 Claims**

1. An anaerobic composition on the basis of a polymerizable oligomer of the acrylic series, consisting of at least one oligocarbonateacrylate of the general formula

$$CH_2{=}C(X)COORO[COOR'OCOOR''O]_n$$
$$COOR'OCOOROCOC(X){=}CH_2,$$

where

X is a radical selected from the group consisting of —H, $-CH_3$ and a halogen;

R is a radical selected from the group consisting of glycol and bisphenol radicals;

R′ is a radical selected from the group consisting of glycol, bisphenol and polyol radicals;

R″ is a radical selected from the group consisting of alkyl and aryl radicals;

n is equal to 0 or 1,

taken in a quantity of 98 parts by weight; a polymerization inhibitor, bis[5-methyl-3-tertiary butyl-2-oxyphenyl]methane, taken in a quantity of from 0.02 to 0.03 part by weight; a polymerization initiator, benzoyl peroxide, combined with a polymerization accelerator, ferrocene, in the ratio of from 1:1 to 1:0.005 taken at the rate of from 0.05 to 1 part by weight; and a plasticizer, a polymerizable ester of acrylic acid of the formula

$$R'''{-}OOC{-}C(CH_3){=}CH_2,$$

where R‴ is alkyl radical C_8—C_{12}, taken in a quantity of from 2 to 5 parts by weight.

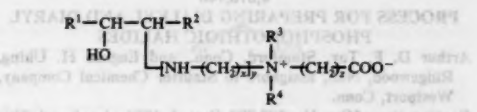
4,076,743

NOVEL BETAINES, PROCESSES FOR THE PREPARATION THEREOF AND RECOVERY OF UNDERGROUND PETROLEUM THEREWITH

Karlheinz Koch, Haan, and Horst Rutzen, Langenfeld, both of Germany, assignors to Henkel KGaA, Dusseldorf and Durtsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, both of, Germany

Filed Jan. 10, 1977, Ser. No. 758,035
Claims priority, application Germany, Jan. 10, 1976, 2600779
Int. Cl.² C07C *101/12, 101/24;* C09K *3/00*
U.S. Cl. 260—501.13 **7 Claims**

1. Water-soluble betaines of the formula:



wherein R^1 and R^2 each represents a $C_{1\text{-}17}$ alkyl group, the sum of the number of carbon atoms in R^1 and R^2 being 9 to 18; R^3 and R^4 represents the same or different $C_{1\text{-}6}$ alkyl or alkylol group; *x* represents 2,3 or 4; *y* represents 0 or 1, and *z* represents 1, 2, 3 or 4.

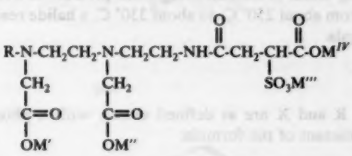
4,076,744

AMPHOTERIC SURFACTANTS

Saul Kaplan, Teaneck; John J. Merianos, Jersey City, both of N.J.; Harold A. Green, Havertown, Pa., and Alfonso N. Petrocci, Glen Rock, N.J., assignors to Kewanne Industries, Inc., Bryn Mawr, Pa.

Filed May 23, 1977, Ser. No. 799,697
Int. Cl.² C07C *143/15;* C11D *3/48*
U.S. Cl. 260—501.19 **1 Claim**

1. Compound having the structure:



where R is an alkyl group of from 8 to 14 carbon atoms, and where M′, M″, M‴, and M^{IV} may be the same or different and constitute monovalent moieties selected from the group consisting of hydrogen, alkali metal, ammonium ion, and ammonium ion that is substituted by from 1 to 3 lower alkyl groups, each of from 1 to 3 carbon atoms, and wherein each of said alkyl groups is either unsubstituted or is substituted by one hydroxyl group.

4,076,745

PROCESS FOR CALCIUM SALTS α-KETOCARBOXYLIC ACIDS

Eric Lodewyk, Boulder, Colo., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 8, 1976, Ser. No. 703,498
Int. Cl.² C07C *53/24, 87/08*
U.S. Cl. 260—526 R **1 Claim**

1. A process for the preparation of a calcium salt of an α-ketocarboxylic acid selected from the group consisting of α-ketoisovaleric acid, α-ketoisocaproic acid, and α-keto-β-methylvaleric acid, which process comprises:

(a) treating said α-ketocarboxylic acid with substantially an equimolar amount of triethylamine in methanol at a temperature between about 0° and 40° C for a sufficient period of time to afford a methanolic solution of the triethylamine salt of said α-ketocarboxylic acid,

(b) treating the product of step (a) with a methanolic solution of substantially one-half mole calcium chloride relative to said triethylamine salt at a temperature between about 0° and 80° C for a sufficient period of time to afford a precipitate of the calcium salt of said α-ketocarboxylic acid, and

(c) isolating said calcium salt.

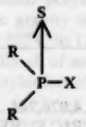
4,076,746

PROCESS FOR PREPARING DIALKYL AND DIARYL PHOSPHONOTHIOIC HALIDES

Arthur D. F. Toy, Stamford, Conn., and Eugene H. Uhing, Ridgewood, N.J., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 502,702, Sept. 3, 1974, abandoned. This application Jun. 9, 1976, Ser. No. 694,270
Int. Cl.[2] C07F 9/04
U.S. Cl. 260—543 P 6 Claims

1. A method of preparing compounds of the formula:



wherein R is selected from the group consisting of alkyl having 1 to about 20 carbon atoms, monocyclic and bicyclic fused ring aryl derivatives thereof; cycloalkyl having 5 to 6 ring carbons; aryl having up to 3 fused rings; biphenyl; and alkyl of 1 to about 4 carbon atoms, substituted derivatives of said cycloalkyl, aryl and biphenyl; and X is selected from the group consisting of chlorine and bromine, which method consists of contacting under at least an autogenous pressure at a temperature of from about 250° C. to about 330° C. a halide reactant of the formula:

RX II

wherein R and X are as defined above, with a phosphorus sulfide reactant of the formula:

P_4S_3 III

4,076,747

PROCESS FOR HYDRATION OF ACRYLONITRILE TO PRODUCE ACRYLAMIDE

Ken Matsuda, Stamford, and Kin Hsueh-Yuan Tsu, Norwalk, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 558,999, Mar. 17, 1975, abandoned. This application Jun. 14, 1976, Ser. No. 696,087
Int. Cl.[2] C07C 102/08
U.S. Cl. 260—561 N 1 Claim

1. In the catalytic hydration of acrylonitrile to product acrylamide wherein an aqueous feed solution of acrylonitrile is contacted in a reactor with a solid heterogeneous catalyst for the hdyration reaction, the improvement wherein the solubility of acrylonitrile in said aqueous feed solution is increased by addition of acrylamide up to about 35% of the feed solution as fed to said reactor as a cosolvent in said feed solution and acrylonitrile is dissolved in said feed solution containing the acrylamide cosolvent in an amount to make an enriched feed solution having acrylonitrile concentration higher than the saturation concentration of acrylonitrile in water without a cosolvent.

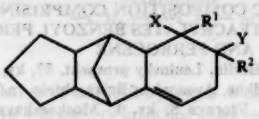
4,076,748

POLYCYCLIC SCENTS

Werner Hoffmann, Neuhofen, and Karl von Fraunberg, Bobenheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jul. 26, 1976, Ser. No. 708,994
Int. Cl.[2] C07C 49/36
U.S. Cl. 260—586 F 4 Claims

1. A Diels-Alder adduct of the formula



(I)

where R^1 and R^2 are independently —H or —CH_3, or R^1 and R^2 together are a further bond between the carbon atoms on which they are present, one of X and Y is —H or —CH_3 and the other is —$COOH_3$, —$COOC_2H_5$, —CHO, —CO —CH_3, or —CO —C_2H_5.

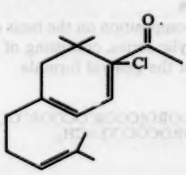
4,076,749

SUBSTITUTED ACETONAPHTHONES, PROCESSES FOR PREPARING SAME, USES OF SAME IN PERFUMERY, AND INTERMEDIATES USED IN SAID PROCESSES

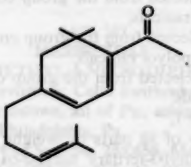
William L. Schreiber, Jackson; James N. Siano, Keyport, both of N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Nov. 11, 1976, Ser. No. 740,890
Int. Cl.[2] C07C 49/48
U.S. Cl. 260—586 R 2 Claims

1. A compound having the structure:



2. A compound having the structure:



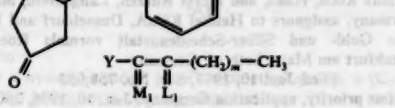
4,076,750

2-DECARBOXY-2-HYDROXYMETHYL-3,7-INTER-M-PHENYLENE-3-OXA-9-DEOXY-PGD, COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,773
Int. Cl.[2] C07C 49/82
U.S. Cl. 260—590 C 22 Claims

1. A prostaglandin analog of the formula



wherein Y is trans-CH=CH—;
wherein M_1 is

or

wherein R_5 is hydrogen or methyl; wherein L_1 is

or a mixture of

and

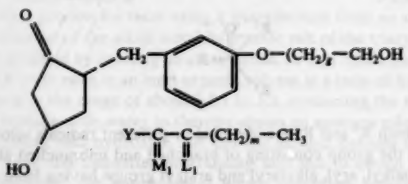
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,076,751
2-DECARBOXY-2-HYDROXYMETHYL-3,7-INTER-M-PHENYLENE-3-OXA-PGE$_1$ COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

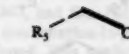
Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,777
Int. Cl.^{2} C07C *49/84*
U.S. Cl. 260—590 C **22 Claims**

1. A prostaglandin analog of the formula



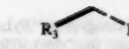
wherein Y is trans—CH=CH—;
wherein M_1 is

or

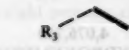


wherein R_5 is hydrogen or methyl;
wherein L_1 is

or a mixture of



and



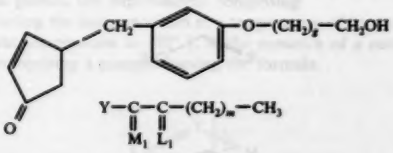
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same of different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,076,752
2-DECARBOXY-2-HYDROXYMETHYL-3,7-INTER-M-PHENYLENE-3-OXA-9-DEOXY-9,10-DIDEHYDRO-PGD$_1$ COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,776
Int. Cl.^{2} C07C *49/84*
U.S. Cl. 260—590 C **22 Claims**

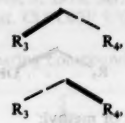
1. A prostaglandin analog of the formula



wherein Y is trans-CH=CH-; wherein M_1 is

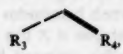
or

wherein R_5 is hydrogen or methyl; wherein L_1 is



or a mixture of

and



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and wherein *m* is one to 5, inclusive.

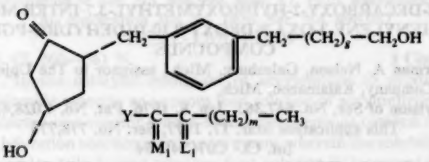
4,076,753

2-DECARBOXY-2-HYDROXYMETHYL-3,7-INTER-M-PHENYLENE-PGE$_1$ COMPOUNDS

Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 647,363, Jan. 8, 1976, Pat. No. 4,028,419. This application Mar. 17, 1977, Ser. No. 778,644
Int. Cl.^{2} C07C *49/82*
U.S. Cl. 260—590 C **22 Claims**

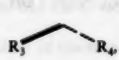
1. A prostaglandin analog of the formula



wherein Y is trans—CH=CH—;
wherein M_1 is

or

wherein R_5 is hydrogen or methyl;
wherein L_1 is



-continued

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, the same or different, with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein *g* is one, 2, or 3; and
wherein *m* is one to 5, inclusive.

4,076,754

FORMALDEHYDE MANUFACTURING PROCESS

Gary L. Kiser, Seabrook, and Bobby G. Hendricks, Deer Park, both of Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 20, 1976, Ser. No. 650,801
Int. Cl.^{2} C07C *45/16*
U.S. Cl. 260—603 C **9 Claims**

1. In a process for the manufacture of formaldehyde by the silver catalyzed oxidation of methanol in two series stages in which the second stage is typically operated with mole ratio of air to methanol of 1.70 -2.40, adiabatic temperature of 500°–700° C and space velocity of 50,000–3,000,000 hr^{-1}, the improvement comprising using as catalyst for the second oxidation stage a fixed composite catalyst prepared by sintering (a) an upstream layer of foraminous silver having a void volume of 75 to 90% and thickness of from about 10 to about 100 mm, the upstream layer being contiguous to (b) a downstream layer of crystalline silver particles having a void volume of 65 to 75%, which is at least about 5% below the void volume of the upper layer, and thickness ranging from about 5 to about 20 mm.

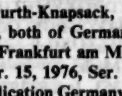
4,076,755

PRODUCTION OF HYDROXYALKYLPHOSPHINE OXIDES

Bernd Lippsmeier, Hurth-Knapsack, and Klaus Hestermann, Erftstadt-Bliesheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 15, 1976, Ser. No. 666,699
Claims priority, application Germany, Mar. 19, 1975, 2511932
Int. Cl.^{2} C07F *9/53*
U.S. Cl. 260—606.5 P **16 Claims**

1. A process for making tertiary hydroxyalkylphosphine oxides of general formula (I)



(I)

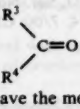
in which R^1 and R^2 are identical or different radicals selected from the group consisting of branched and unbranched alkyl, cycloalkyl, aryl, alkylaryl and aralkyl groups having from 1 to 18 carbon atoms, where R^1 may be identical with R^2 and R^2 may be identical with R, which is a radical of general formula (II)

(II)

in which R^3 and R^4 are identical or different radicals selected from the group consisting of branched and unbranched alkyl, cycloalkyl, aryl, alkylaryl and aralkyl groups having from 1 to 18 carbon atoms and hydrogen, which process comprises subjecting phosphines of general formula (III)

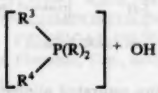
(III)

in which R^3 and R^4 have the meanings given above to a single step reaction with carbonyl compounds of general formula (IV)



(IV)

in which R^3 and R^4 have the meanings given above, the reaction being effeted by introducing the phosphine of general formula (III) into an aqueous phase containing the carbonyl compound of formula (IV) and being adjusted to a pH-value of from 8 to 13.5 by adding thereto a water soluble base yielding hydroxyl ions selected from the group consisting of NaOH, KOH, NH_4OH and phosphonium hydroxides of general formula (V)



(V)

and separating the resulting hydroxyalkylphosphine oxide of general formula (I) from the reaction product obtained.

4,076,756

PROCESS FOR THE PREPARATION OF TRIARYLBORANE

Nicholas Nazarenko, and William Carl Seidel, both of Orange, Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 12, 1975, Ser. No. 630,994

Int. Cl.² C07F 5/04

U.S. Cl. 260—606.5 B **3 Claims**

1. In a process for recovering a triarylborane from an aqueous solution of the alkali metal hydroxide salt of the triarylborane obtained by reacting an alkali metal, an aryl halide and an orthoborate ester in an inert organic solvent at a ratio of halide to ester in the range of about 3.5:1 to 3:1, contacting the reaction mixture with water to thereby obtain an aqueous solution comprising said hydroxide salt and the alcohol derived from said ester and thereafter neutralizing said salt to obtain said triarylborane, the improvement which comprises separating said alcohol from the aqueous solution of said hydroxide salt before neutralization of said hydroxide salt.

4,076,757

3-METHOXYCYCLOOCTADIENE-(1,5)

Gunther Wilke, and Paul Heimbach, both of Mulheim (Ruhr), Germany, assignors to Studiengesellschaft Kohle m.b.H., Mulheim (Ruhr), Germany

Division of Ser. No. 585,287, Jun. 9, 1975, Pat. No. 4,032,585, which is a division of Ser. No. 463,087, Apr. 22, 1974, Pat. No. 3,929,921, which is a division of Ser. No. 109,949, Jan. 26, 1971, Pat. No. 3,849,506, which is a division of Ser. No. 843,220, Jul. 18, 1969, Pat. No. 3,586,727, and Ser. No. 845,901, Jul. 29, 1969, Pat. No. 3,629,347, and Ser. No. 845,904, Jul. 29, 1969, abandoned, each is a continuation-in-part of Ser. No. 582,775, Sep. 27, 1966, abandoned. This application Nov. 1, 1976, Ser. No. 737,766

Claims priority, application Germany, Sep. 29, 1965, 1493221

Int. Cl.² C07C 43/18

U.S. Cl. 260—611 R **1 Claim**

1. 3-Methoxycycloctodiene-(1,5) having a boiling point of 86° C and n_D^{20} of 1.4887.

4,076,758

SYNTHESIS OF VICINAL GLYCOLS

Dennis C. Owsley, St. Louis, and Jordan J. Bloomfield, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 9, 1976, Ser. No. 749,127

Int. Cl.² C07C 29/00, 31/14

U.S. Cl. 260—618 R **18 Claims**

1. In the process of coupling relatively low molecular weight primary alcohols to form relatively higher molecular weight vicinal glycols, the improvement comprising employing a trialkylsilyl protecting group on the hydroxyl position of said low molecular weight primary alcohol during said coupling reaction.

4,076,759

PRODUCTION OF PHENOLS

Peter Graham Spencer Field, St-Foy-les-Lyons, France, and Ronald Bennett, Chester, England, assignors to Burmah Oil Trading Limited, Wirral, Great Britain

Filed May 5, 1975, Ser. No. 574,756

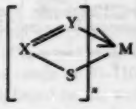
Claims priority, application United Kingdom, May 6, 1974, 19806/74

Int. Cl.² C07C 37/08, 39/06, 45/08

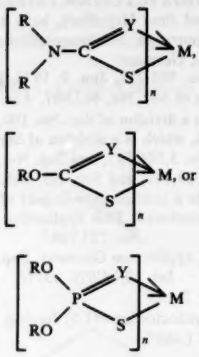
U.S. Cl. 260—621 C **23 Claims**

1. In the process comprising decomposing a secondary aralkyl hydroperoxide, in which the aryl nucleus is substituted by at least one secondary alkylhydroperoxide group containing from 2 to 24 carbon atoms and said aryl nucleus may be further substituted by one or more other substituents selected from halogen atoms and alkyl, alkoxy and nitro groups, to produce a correspondingly substituted or unsubstituted mono- or polyhydric phenol, the improvement comprising:

effecting the decomposition at a temperature of from ambient temperature to 180° C in the presence of a catalysts comprising a complex having the formula



wherein Y represents an atom of sulphur or oxygen, M is tin, antimony or a transition metal appearing in Group VIII, Ib or IIb of the Periodic Table. N is the oxidation state of M, and X is selected such that said formula is



wherein each R represents an unsubstituted hydrocarbyl group containing 1 to 12 carbon atoms; and

recovering said correspondingly substituted or unsubstituted mono- or polyhydric phenol from the decomposition product.

4,076,760
PROCESS FOR THE PREPARATION OF FLUOROCARBON WAXES

Robert Hartwimmer, Burghausen, Salzach, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 155,650, Jun. 22, 1971, abandoned. This application Mar. 24, 1975, Ser. No. 561,230

Claims priority, application Germany, Jun. 24, 1970, 2031046

Int. Cl.² C07C *19/00*

U.S. Cl. 260—653.1 R **4 Claims**

1. Process for the preparation of solid fluorocarbon waxes which process consists essentially of thermic cracking of polytetrafluorethylene or copolymers of tetrafluorethylene and higher perfluoro-olefins at elevated temperatures and under increased pressures, wherein the pyrolysis is carried out at temperatures of from 350° to 700° C and under partial pressures of the degradation products of from 5 to 100 atmospheres gauge.

4,076,761
PROCESS FOR THE MANUFACTURE OF GASOLINE

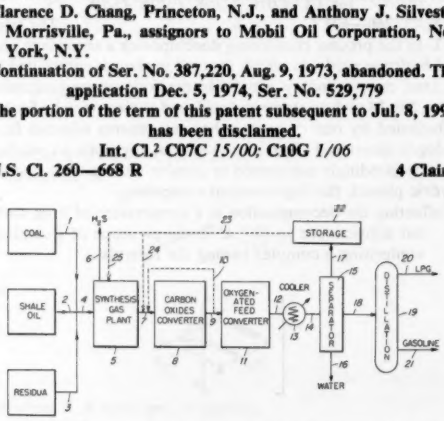
Clarence D. Chang, Princeton, N.J., and Anthony J. Silvestri, Morrisville, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 387,220, Aug. 9, 1973, abandoned. This application Dec. 5, 1974, Ser. No. 529,779

The portion of the term of this patent subsequent to Jul. 8, 1992, has been disclaimed.

Int. Cl.² C07C *15/00;* **C10G** *1/06*

U.S. Cl. 260—668 R **4 Claims**



1. In the process for manufacture of liquid hydrocarbon fuels boiling in the gasoline boiling range from coal which comprises converting the coal to a gaseous mixture of hydrogen and carbon oxides and converting said gaseous mixture to normally liquid hydrocarbons and oxygen-substituted hydrocarbons comprising methanol; the improvement comprising the additional step of contacting at least said oxygen-substituted hydrocarbons including said methanol with a catalytically active aluminosilicate zeolite having a silica to alumina ratio of at least about 12, a constraint index of about 1 to 12 and a crystal density, in the hydrogen form, of not substantially below about 1.6 grams per cubic centimeter at a temperature of about 500° to 1000° F, a space velocity of about 0.1 to 50 liquid hourly space velocity, and a pressure of about 1 to 50 atmospheres; and, covering liquid hydrocarbons.

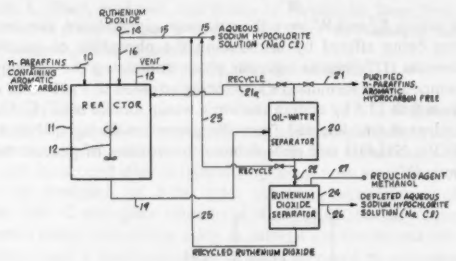
4,076,762
CONTINUOUS PROCESS FOR THE REMOVAL OF OTHER HYDROCARBONS FROM SATURATED ALIPHATIC HYDROCARBONS

Miron Abramovici, Somerset, and Eric W. Stern, Mountainside, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Filed Apr. 29, 1977, Ser. No. 792,175

Int. Cl.² C07C *9/14, 7/00;* **C10G** *27/02*

U.S. Cl. 260—676 R **17 Claims**



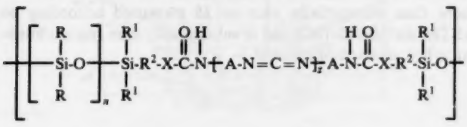
1. A method for treating saturated aliphatic hydrocarbons containing in admixture therewith compounds selected from the group consisting of aromatic hydrocarbons, substituted aromatic hydrocarbons, unsaturated aliphatic hydrocarbons, saturated cycloaliphatic hydrocarbons and unsaturated cycloaliphatic hydrocarbons for the removal of said compounds which comprises (a) contacting said admixture with a selective oxidizing aqueous hypochlorite solution containing a low oxidation state ruthenium compound convertible in the presence of said hypochlorite to a higher oxidation state ruthenium compound capable of selectively oxidizing said compounds, said aqueous hypochlorite being present in a stoichiometric excess relative to said compounds in said admixture, said contacting resulting in the selective oxidation of said compounds to carbon dioxide and/or water-soluble oxygenated compounds, (b) recovering the resulting hydrocarbon reaction phase from the aqueous phase, (c) withdrawing from said recovered hydrocarbon phase at least a portion of said saturated aliphatic hydrocarbons as product, (d) returning at least a portion of the aqueous phase from step (b) to said contacting step (a), (e) intermittently withdrawing a portion of said aqueous phase separated from step (b), (f) adding to said intermittently withdrawn portion of said aqueous phase a reducing agent for the conversion of hypochlorite in said aqueous phase to corresponding chloride and for the reduction of the higher oxidation state ruthenium compound to said low oxidation state ruthenium compound, (g) recycling said low oxidation state ruthenium compound from step (f) to said contacting step (a), and (h) withdrawing from step (f) said resulting aqueous phase containing said corresponding chloride and said water-soluble oxygenated organic compounds derived from the selective oxidation of said compounds.

4,076,763
POLYSILOXANE/POLYCARBODIIMIDE COPOLYMERS

Karl-Friedrich Thom, and Reinhard Schliebs, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 11, 1977, Ser. No. 758,528
Claims priority, application Germany, Jan. 23, 1976, 2602413
Int. Cl.[2] C08L *83/00*
U.S. Cl. 260—824 R **7 Claims**

1. An organopolysiloxane/polycarbodiimide copolymer comprising optionally repeating structural units of the formula



wherein

R is an alkyl, alkenyl or aryl radical with up to 12 carbon atoms,

R^1 is an alkyl radical with up to 4 carbon atoms,

R^2 is a divalent hydrocarbon radical with up to 6 carbon atoms,

X is oxygen or the group —N—R^3,

R^3 is hydrogen or an alkyl, aryl, aralkyl or cycloalkyl radical with up to 8 carbon atoms,

A is a divalent aromatic radical with up to about 40 carbon atoms,

n is an integer from 0 to about 10,000,

z is an integer from 1 to about 1500.

4,076,764
EPOXY RESIN COMPOSITION HAVING IMPROVED PHYSICAL PROPERTIES

Ronald S. Bauer, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 22, 1976, Ser. No. 707,909
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—834 **9 Claims**

1. A heat-curable composition comprising (1) a glycidyl ether of a polyhydric phenol having at least one vicinal epoxy group and wherein the carbon-to-carbon bonds within the six-membered phenolic group are saturated, (2) a curing amount of an urea-formaldehyde or melamine-formaldehyde resin and (3) from about 0.01 to about 5.0 parts per hundred parts by weight of the glycidyl ether of at least one stabilizer selected from the group consisting of actinic stabilizers and heat stabilizers.

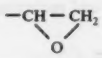
4,076,765
UNSATURATED EPOXY ESTER RESIN

Makoto Nakahara, Osaka; Yoshiya Fukuyama, Hirakata; Kazuo Sumiyoshi, Toyonaka, and Katsuo Akagane, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Sep. 2, 1976, Ser. No. 720,079
Claims priority, application Japan, Sep. 9, 1975, 50-109744
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—835 **18 Claims**

1. An unsaturated epoxy ester which comprises the reaction product of the following three components:

1. the first component selected from the group consisting of
   i. a partial esterification compound obtained by the reaction of trimellitic anhydride with an unsaturated monoalcohol,
   ii. a partial esterification compound obtained by the reaction of pyromellitic anhydride with an unsaturated monoalcohol, and
   iii. a mixture of (i) and (ii),
2. the second component selected from the group consisting of
   i. a partial esterification compound obtained from a dicarboxylic anhydride and an unsaturated monoalcohol,
   ii. a polymerizable unsaturated monobasic acid, and
   iii. a mixture of (i) and (ii), and
3. as the third component a compound containing at least two epoxy groups in the molecule, the unsaturated monoalcohol employed in (1)-(i) or (ii) being the same or different from that of (2)-(i) and the amount of unsaturated monoalcohol being equimolar to or slightly in excess of the whole acid component, and the ratio of total —COOH groups to the total



groups in the reaction system being 0.9 to 1.1.

4,076,766
FLEXIBLE THERMOSETTING ACRYLIC ENAMELS

John Alvin Simms, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 562,938, March 27, 1975, abandoned. This application Dec. 31, 1975, Ser. No. 645,696
Int. Cl.[2] B32B *15/04;* **C08L** *61/26*
U.S. Cl. 260—850 **26 Claims**

12. A thermosetting acrylic enamel wherein the film-forming constituents consist essentially of:

(A) 20% by weight, based on the weight of (A) plus (B) plus (C), of an acrylic polymer consisting essentially of:
   (1) 61% by weight, based on the weight of the polymer, of butyl acrylate;
   (2) 10% by weight, based on the weight of the polymer, of 2-hydroxyethyl acrylate;
   (3) 26% by weight, based on the weight of the polymer, of methyl methacrylate; and
   (4) 3% by weight, based on the weight of the polymer, of acrylic acid; and
   10% by weight, based on the weight of (A) plus (B) plus (C), of an acrylic polymer consisting essentially of:
   (1) 38% by weight, based on the weight of the polymer, of butyl acrylate;
   (2) 8% weight, based on the weight of the polymer, of 2-hydroxyethyl acrylate;
   (3) 50% by weight, based on the weight of the polymer, of styrene; and
   (4) 4% by weight, based on the weight of the polymer, of acrylic acid;
   said acrylic polymer has an inherent viscosity, at 25° C, of 0.1–0.3 as determined as a 0.5% solution in 1,2-dichloroethane;

(B) 40% by weight, based on the weight of (A) plus (B) plus (C), of a polyester prepared from neopentyl glycol and adipic acid; wherein said polyester has a molecular weight not exceeding 2,000, a maximum acid number of 5, and a hydroxyl number range of 70–110; and

(C) 30% by weight, based on the weight of (A) plus (B) plus (C), of a butylated melamine formaldehyde crosslinking agent;

wherein the enamel also contains pigment.

22. A metallic substrate coated with the thermosetting acrylic enamel of claim **12**.

4,076,767

CURABLE MIXED POLYESTER RESIN COMPOSITIONS

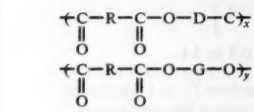
Hiroshi Samejima, Ibaragi, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Division of Ser. No. 595,304, Jul. 11, 1975, Pat. No. 4,032,593. This application Jun. 22, 1976, Ser. No. 698,608
Claims priority, application Japan, Jul. 12, 1974, 49-79862
Int. Cl.[2] C08L 67/06
U.S. Cl. 260—862 11 Claims

1. A curable unsaturated polyester resin composition which comprises

A. an unsaturated polyester having a molecular weight of 500 to 5,000,

B. an aromatic copolyester having a weight average molecular weight of 10,000 to 100,000 and composed of recurring units of formula (I) and recurring units of formula (II)



(I)

(II)

wherein R is a residue resulting from the removal of carboxyl groups from an aromatic dicarboxylic acid; D is a residue resulting from the removal of hydroxyl groups from a glycol containing 2 to 15 carbon atoms; G is a residue resulting from the removal of the terminal hydroxyl group from a long-chain poly(alkylene oxide) glycol having a number average molecular weight of 350 to 6,000; and

$$\frac{x}{x+y}$$

is from 0.2 to 0.8, and

C. an ethylenic monomer polymerizable with the unsaturated polyester (A), the amount of the aromatic copolyester (B) being 1 to 35 parts by weight per 100 parts by weight in total of the unsaturated polyester (A) and the ethylenic monomer (C).

4,076,768

CROSS-LINKED BLOCK COPOLYMER BLENDS WITH IMPROVED IMPACT RESISTANCE

Frank L. Saunders, Midland, and Ronald R. Pelletier, Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 473,642, May 28, 1974, Pat. No. 3,936,365. This application Nov. 13, 1975, Ser. No. 631,765
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.[2] C08L 51/00, 53/00
U.S. Cl. 260—876 B 11 Claims

1. A method for improving the impact resistance of a normally solid non-elastomeric monovinylidene aromatic polymer which is subjected to mechanical processing, said method comprising the steps of (1) subjecting colloidal size particles of an elastomeric block copolymer of from about 20 to about 80 weight percent of an elastomeric block of conjugated diene and from about 80 to about 20 weight percent of a non-elastomeric block of monovinylidene aromatic monomer to conditions sufficient to effect crosslinking of the copolymer and (2) combining an amount of the resulting crosslinked copolymer particulate with the non-elastomeric monovinylidene aromatic polymer containing at least 70 weight percent of polymerized monovinylidene aromatic monomer wherein the amount of copolymer is sufficient to improve the impact strength of the non-elastomeric polymer, said crosslinking being sufficient to enable the block copolymer to remain in the form of colloidal size particles during mechanical processing, but less than that required to render the copolymer non-elastomeric.

4,076,769

ABS FILMS

William A. Watts, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 448,088, Mar. 4, 1974, abandoned. This application Jan. 15, 1976, Ser. No. 649,384
Int. Cl.[2] C08L 9/02, 25/04
U.S. Cl. 260—893 8 Claims

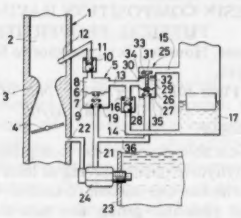
1. An ABS film substantially 0.5 to 2 mils thick composed of a rubber phase of natural rubber or butadiene-containing rubber dispersed in a continuous phase of a resin composed essentially of styrene-containing copolymer, which film has been biaxially stretched to the unoriented ABS film to 2 to 36 times the area of the unoriented film, which film has a haze of no more than substantially zero to 25 measured according to ASTM method D-1003 and is substantially free from whitening when stressed or creased.

4,076,770

CARBURETOR WITH AUXILIARY ACCELERATOR-PUMP SYSTEM

Haruhiko Saito, Nagoya, and Michio Morishita, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 29, 1977, Ser. No. 782,347
Claims priority, application Japan, Nov. 16, 1976, 51-136857
Int. Cl.[2] F02M 7/08
U.S. Cl. 261—34 A 9 Claims



1. A carburetor with an auxiliary accelerator-pump system, comprising:

an intake passage including a venturi portion and a throttle valve;

a fuel reservoir or bowl;

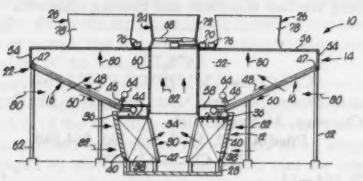
an auxiliary acceleration-pump including a fuel chamber and a vacuum chamber separated by a spring-loaded diaphragm, said fuel chamber being communicated by way of a first check valve to a pump jet opening into said intake passage upstream of said venturi portion and by way of a second check valve to said fuel reservoir, said fuel chamber being further communicated with a portion of said fuel reservoir above the level of fuel therein, and said vacuum chamber being communicated with a portion of said intake passage downstream of said throttle valve; and

a vacuum responsive valve means positioned between said fuel chamber and said portion of said fuel reservoir above the level of fuel, said vacuum responsive valve means including a vacuum chamber communicated with a portion of said intake passage downstream of said throttle valve, and means controlled by said vacuum chamber to communicate said fuel chamber with a portion of said fuel reservoir above the level of fuel.

4,076,771
BOTTOM VENTED WET-DRY WATER COOLING TOWER

James R. Houx, Jr.; Richard D. Landon, both of Shawnee Mission, and Paul A. Lindahl, Jr., Overland Park, all of Kans., assignors to The Marley Cooling Tower Company, Mission, Kans.

Filed Nov. 19, 1976, Ser. No. 743,359
Int. Cl.[2] B01F 3/04
U.S. Cl. 261—159 19 Claims



1. A wet-dry water cooling tower, comprising: a central evaporative water cooling section;

a dry surface water cooling section;

means for supplying hot water to be cooled to said dry section for flow therethrough;

means supporting said dry section above said evaporative section and in at least partial surrounding relationship to said central evaporative section for serial flow of said hot water through said dry and evaporative sections;

structure defining separate air discharge paths for air currents passing from said dry and evaporative sections for preventing mixing of the air from each section prior to discharge thereof from the tower; and

first and second fan means respectively for pulling corresponding ambient-derived cooling air currents through said dry section and said evaporative section and along respective air discharge paths provided for each of the same for thermal interchange with the hot water passing through each of the sections to thereby produce hot moist discharge air to the atmosphere from the evaporative section and hot dry discharge air to the atmosphere from the dry section,

said path-defining structure and air-pulling means being cooperatively constructed and arranged for independent generally upright discharge of said hot moist air at the central region of said tower, and for independent generally upright discharge of said hot dry air separately from the hot moist air and in spaced, substantial surrounding relationship to the latter for lessening characteristic low level deflection and spreading of the hot moist air caused by ambient wind currents.

4,076,772
LARGE, NONPLANAR POLY(METHYL METHACRYLATE) PRE-HOLOGRAPHIC ELEMENT

Warren J. Murbach, China Lake, and Arnold Adicoff, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,902
Int. Cl.[2] B05D 1/38, 5/06, 7/04; G02B 5/32
U.S. Cl. 264—2 6 Claims

1. A method of manufacturing a pre-holographic element comprising the steps of:

Providing a flat poly(methyl methacrylate) support;

applying to said support a smooth coating of a solution comprising 2-methoxyethanol and nitrocellulose;

drying said coating;

denitrating said coating by completely immersing it in a stirred bath of denitrating solution comprising ammonium sulfide and ethanol;

washing said coating;

applying a uniform layer of a gelatin solution to said coating;

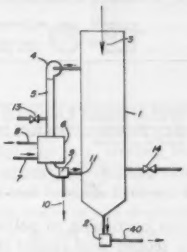
hardening said layer;

forming said element, comprising said support, coating, and layer, by partially supporting it in a dust-free environment at a temperature from 110° to 150° C for a time sufficient to cause said element to be bent about at least one axis.

4,076,773
PROCESS FOR PRILLING AMMONIUM NITRATE

Harry L. Mahl, Jr., and Franklin D. Clark, both of Wilmington, N.C., assignors to W. R. Grace & Co., New York, N.Y.

Continuation of Ser. No. 526,702, Nov. 25, 1974, abandoned.
This application Mar. 18, 1976, Ser. No. 668,013
Int. Cl.[2] C06B 21/00
U.S. Cl. 264—3 E 2 Claims



1. In a process for producing granular ammonium nitrate comprising feeding molten ammonium nitrate containing not more than 5 wt% water into a prill tower containing a cooling gase to form spheroidal granules while maintaining ammonia gas in the cooling gas to retard thermal dissociation of the ammonium nitrate and to decrease formation of aerosol particles of ammonium nitrate, the concentration of ammonia gas in the cooling gas being at least as great as shown in the concentration-temperature curve of FIG. 4, with prilling temperature within the corresponding FIG. 4 values for said respective concentrations, the improvement comprising;

a. withdrawing cooling gas from an upper portion of the prill tower;

b. cooling and dehumidifying the withdrawn gas; and

c. recycling the cooled and dehumidified gas to a lower portion of the prill tower.

4,076,774
DUAL-WALLED MICROCAPSULES AND A METHOD OF FORMING SAME

William T. Short, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

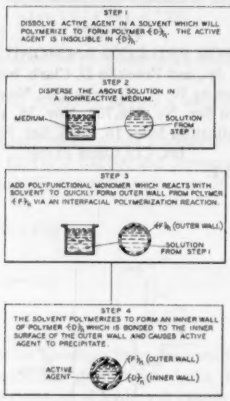
Filed Feb. 27, 1976, Ser. No. 662,027
Int. Cl.[2] B01J 13/02
U.S. Cl. 264—4 4 Claims

1. A method of encapsulating an active agent in a dual-walled microcapsule, said method comprising the steps of:

a. forming a liquid dispersion of beads of a first solution uniformly dispersed throughout a substantially nonreactive medium, said first solution comprising: a polymerizing monomer or mixture of monomers as the solvent which monomers or mixture of monomers polymerize via a condensation mechanism and dissolved therein said active agent, which is compatible with and nonreactive in said monomer solvent and is insoluble in the polymer formed by the polymerization of said monomer solvent; then before said active agent has precipitated;

b. forming a polymeric outer wall around said beads by vigorously stirring said dispersion and simultaneously adding a polyfunctional monomer which rapidly reacts with said solvent monomer at the surface of said beads via an interfacial polymerization reaction to quickly form said

polymeric outer wall around each bead, and which outer wall polymer then presents inwardly to the polymerizing monomer solution a functionality which reacts with said polymerizing monomer solvent to covalently bond said polymerizing monomer solvent and/or polymer formed therefrom to the inner surface of said outer wall, said


STEP 1
DISSOLVE ACTIVE AGENT IN A SOLVENT WHICH WILL POLYMERIZE TO FORM POLYMER $(D)_b$. THE ACTIVE AGENT IS INSOLUBLE IN $(D)_b$
STEP 2
DISPERSE THE ABOVE SOLUTION IN A NONREACTIVE MEDIUM.
MEDIUM
SOLUTION FROM STEP 1
STEP 3
ADD POLYFUNCTIONAL MONOMER WHICH REACTS WITH SOLVENT TO QUICKLY FORM OUTER WALL FROM POLYMER $(P)_b$ VIA AN INTERFACIAL POLYMERIZATION REACTION.
$(P)_b$ (OUTER WALL)
SOLUTION FROM STEP 1
STEP 4
THE SOLVENT POLYMERIZES TO FORM AN INNER WALL OF POLYMER $(D)_b$ WHICH IS BONDED TO THE INNER SURFACE OF THE OUTER WALL AND CAUSES ACTIVE AGENT TO PRECIPITATE.
ACTIVE AGENT
$(P)_b$ (OUTER WALL)
$(D)_b$ (INNER WALL)

monomer solvent continuing to polymerize and form a solid polymeric second wall against the inner surface of said first wall and causing the active agent to precipitate and migrate towards the center of the microcapsule, said active agent being thereby encapsulated in a dual-walled microcapsule.

4,076,775

BLOCK FUEL ELEMENTS FOR HIGH TEMPERATURE POWER REACTORS

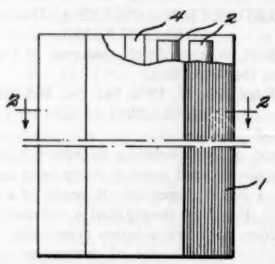
Karl-Gerhard Hackstein, Hanau; Milan Hrovat, Rodenbach, and Willi Wolff, Kahl, all of Germany, assignors to Nuken G.m.b.H., Hanau, Germany

Continuation of Ser. No. 326,151, Jan. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 218,244, Jan. 17, 1972, abandoned. This application Jan. 22, 1976, Ser. No. 651,563

Claims priority, application Germany, Feb. 15, 1972, 2207011; Jan. 30, 1971, 2104431

Int. Cl.² G21C *21/00*

U.S. Cl. 264—0.5 **11 Claims**



1. A process for the production of a block fuel element with parallel cooling channels having an isotropic structure and useful for gas cooled high temperature reactors consisting of preparing isotropic granulates by molding resin containing graphite molding powder by an isotropical consolidation process to obtain a molded product with isotropic properties, comminuting and sieving said product to form said isotropic granulates, compression molding said isotropic granulates into a block containing parallel fuel channels and coolant channels, inserting into said fuel channels premolded fuel compacts made of fuel particles coated with resin containing graphite molding powder completing the molding of the block fuel element by compressing said block containing said fuel compacts at a pressure not over 300 kg/cm² and cooling channels to final dimensions and thereafter carbonizing the resin binder and heat-treating the molded block, the sole mechanical processing steps in said process being the said steps of molding, grinding and sieving the isotropic granulate and the steps of molding the block with cooling channels and fuel channels therein and of compressing the block shaped element from the molded block containing the fuel compacts and cooling channels.

4,076,776

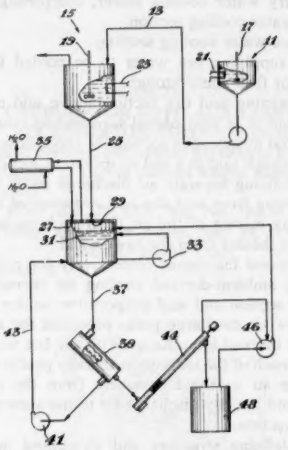
CALCIUM CHLORIDE PRILLING

William G. Moore, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 2, 1975, Ser. No. 564,248

Int. Cl.² B01J *2/06*

U.S. Cl. 264—13 **13 Claims**



1. A method to produce calcium chloride particulate comprising:

a. passing a molten aqueous solution of calcium chloride into an enclosed container of boiling liquid refrigerant, said refrigerant having a boiling temperature of less than the freezing temperature of the calcium chloride solution;

b. allowing the calcium chloride solution to fall a sufficient distance from above the boiling liquid refrigerant to permit the calcium chloride solution to form droplets before contacting the liquid refrigerant;

c. solidifying the calcium chloride solution droplets in the boiling liquid refrigerant as prills; and

d. removing the formed prills from the boiling liquid refrigerant.

4,076,777

METHOD AND APPARATUS FOR FORMING A CONCRETE ROOF

Vladimir Petrovitch, 4 Putnam Hill, Greenwich, Conn. 06830

Continuation of Ser. No. 586,366, Jun. 12, 1975, abandoned. This application Feb. 16, 1977, Ser. No. 769,399

Int. Cl.² E04B *1/16*

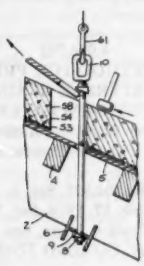
U.S. Cl. 264—32 **14 Claims**

1. A method of constructing a concrete roof on top of a large structure having an open interior with the aid of a plurality of prefabricated elongated sector-shaped form members, each sector-shaped form member having a wide end and a narrow end with each being disposed at a different opposite end por-

tion of the length thereof, each form member having a sector-shaped upper surface for receiving and supporting a layer of reinforced concrete and an integral supporting beam extending below the upper surface between the ends thereof to enable the form to resist bending mounts applied thereto either by the weight of the form when the form is suspending from a single suspension point disposed intermediate with respect of its ends or by the weight of a layer of concrete on the top surface of the form when the form member is supported only at its ends, the method including the steps of:

erecting a staging extending vertically to a predetermined height above the structure in the center of the interior of the structure, the staging being self-supporting and independent of the structure;

successively positioning each sector-shaped form member with its wide end being supportably engaged by the upper portion of the structure and with the under side of each form member adjacent its narrow end being supportably engaged by the erected staging, such that the upper sector-shaped surface of each form member extends inwardly and upwardly from the structure and is adapted to receive and support a layer of reinforced concrete, each form member being otherwise unsupported, and each form member being flanked by adjacent form members to provide a substantially continuous upper surface having a centrally disposed access opening therein which is substantially in alignment with the narrow ends of the form members;



covering the upper surfaces of the form members with a layer of reinforced concrete to form a roof having an opening corresponding to the access opening in the continuous upper surface provided by the form members and that is large enough to permit removal of each form member intact through said opening;

suspending each of the form members at said single suspension point from the roof after the concrete has cured to a predetermined strength, thereby enabling the roof to carry up to all the weight of each form member that was heretofore carried by the structure and the erected staging;

removing the staging from engagement with the form members and from the interior of the structure through the opening in the roof, the suspending of each form from the roof supporting each form member upon the removing of the staging;

applying a lifting force to a form member at said suspension point thereof to remove the load of the form member at said suspension point away from the roof;

disengaging from the structure the wide end of the form member to which the lifting force is applied;

reducing the lifting force on the form member to which the lifting force is applied to lower the form member out of engagement with the inner surface of the roof;

repeating the steps of applying a lifting force, disengaging the wide end, and lowering for each of the form members; and

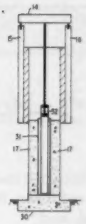
removing each form member intact through said opening in the roof.

4,076,778

CLIMBING FORMWORK

Alan Charles Whitting, 48 Chandos St., St. Leonards, Australia

Filed Apr. 20, 1976, Ser. No. 678,540
Claims priority, application Australia, Apr. 22, 1975, 1322/75
Int. Cl.² E04B *1/16*
U.S. Cl. 264—33 **2 Claims**



1. A method of erecting a concrete structure utilizing climbing formwork, said method comprising the steps of: constructing footings for said structure; erecting inner and outer forms on said footings; supporting vertically extending open tubular support means on said footings between said inner and outer forms; casting a first storey of said structure between said inner and outer forms and around said open tubular support means; inserting, into said open tubular support means, respective double-acting hydraulic jacks, each including a cylinder supported on said footings, a piston movable in the cylinder and an upwardly extending piston rod secured to the piston, with each jack having an extended height exceeding the height of two storeys of said structure; attaching the outer forms to means carried on the upper ends of said piston rods, after the concrete of said first storey has sufficiently set, extending said jacks to take the weight of said forms; stripping said forms from said first storey of said structure; further extending said jacks to elevate said outer forms into positions for pouring the next storey of said structure; supporting said outer forms on the set concrete of the previously cast story of said structure; elevating said inner forms into position for pouring the next storey of said structure; supporting said piston rods on said outer forms while operating said jacks to elevate said cylinders a height corresponding to one storey of said structure; supporting said cylinders in the elevated position; positioning further vertically extending open tubular support means on said first-mentioned tubular support means coaxially of the latter; pouring concrete between said inner and outer forms and around said further open tubular support means, for the next storey of said structure; and repeating the foregoing steps for each storey of the structure.

4,076,779

METHOD OF RESTORING THE FLUID PERMEABILITY OF A USED, CERAMIC FLUID-RELEASE MOLD

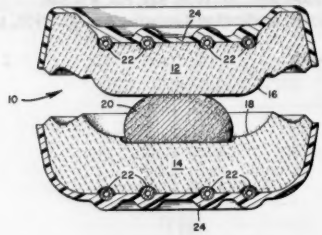
Rudolph A. Skriletz, Marysville, Ohio, assignor to Wallace-Murray Corporation, New York, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,086
Int. Cl.² B28B *7/38*
U.S. Cl. 264—39 **31 Claims**

1. A method of restoring the fluid permeability of a used, ceramic, fluid-release mold body comprising at least 70% alumina and having a mold face on one exterior surface thereof, said mold face having accumulated thereon a quantity of amorphous, silicon containing material restricting the fluid permeability of said mold body, said method comprising the steps of:

a. applying to said mold face an effective amount of fluorine containing acid capable of chemically removing said accu-

mulated material from said mold face without significant damage to the mold body;



b. maintaining contact between said acid and said mold body for a period of time sufficient for said acid to attack said accumulated material, and

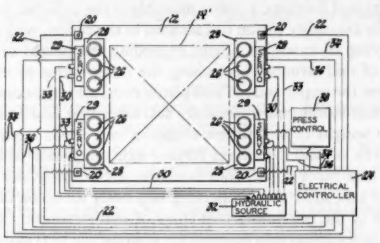
c. thereafter removing said acid from said mold body.

4,076,780

PROGRAMMABLE VELOCITY AND FORCE CONTROL METHOD FOR COMPRESSION MOLDING

Edwin D. Ditto, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 27, 1977, Ser. No. 762,852
Int. Cl.² B29G *1/00*
U.S. Cl. 264—40.5 **8 Claims**



1. The method of molding a mass of molding compound in a press having spaced apart mold halves defining a mold cavity containing the molding compound wherein the press successively operates in a mold closing mode to effect movement of the molding compound into all areas of the mold cavity to define the shape of the desired article and a cure mode wherein high force is applied by the press on the molds while the molding compound cures, comprising the steps of

measuring the position of the mold halves in relation to each other in the direction of mold closing movement at a plurality of monitoring locations spaced in relation to the direction of mold closing movement,

during the closing mode applying a mold closing press force and controlling the net force on the mold by applying individual controllable forces to the press at locations substantially at the said monitoring locations while controlling each of said individual forces in response to the measurements of the relative position of the mold halves so as to maintain a predetermined tilt relationship of the mold halves and controlling the total closing force to effect predetermined mold closing velocity values,

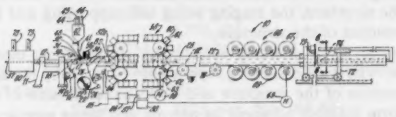
and during the subsequent cure mode, maintaining the individual forces at values to obtain the net press force on the mold at a predetermined value while curing the molding compound, and maintaining parallelism of the mold halves by controlling the individual forces in response to the measured mold position to correct any deviations from a parallel mold condition.

4,076,781

METHOD OF MAKING FOAM PIPE INSULATION INCLUDING CONTROLLING RATE OF PRODUCT DRAW-OFF ACCORDING TO FOAM TEMPERATURE

Frank M. Clay; Leland G. Moran, and Russell R. Lawyer, all of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 545,953, Jan. 31, 1975, Pat. No. 3,985,483. This application Jun. 23, 1976, Ser. No. 699,021
Int. Cl.² B29D *23/00, 27/04*
U.S. Cl. 264—40.7 **3 Claims**



1. In a method of making tubular, foamed plastic pipe insulation by a continuous process wherein at a dispensing station foamable hardenable liquid material is dispensed between an inner liner and an outer jacket for the pipe insulation to foam and harden by an exothermic reaction and motor-driven pulling means is provided to pull the formed pipe insulation away from the dispensing station, the improvement comprising:

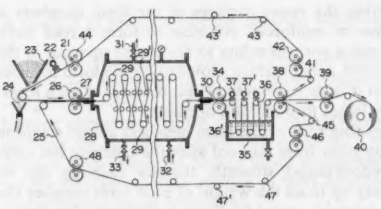
sensing the temperature of the foaming liquid and controlling the speed of the pulling means in accordance with the sensed temperature.

4,076,782

SUPPLYING METHOD FOR PRELIMINARILY EXPANDED POLYSTYRENE BEADS IN A THIN AND UNIFORM LAYER

Masahide Yazawa; Teruo Kubo, and Kunio Suzuki, all of Tokyo, Japan, assignors to Polymer Processing Research Institute Ltd, Tokyo, Japan

Continuation of Ser. No. 503,825, Sep. 6, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,659
Claims priority, application Japan, Sep. 7, 1973, 48-100860
Int. Cl.² B29D *27/00*
U.S. Cl. 264—51 **3 Claims**



1. In the known method for continuously producing a foamed sheet of polystyrene by enclosing preliminarily expanded beads of polystyrene in a circulating steam-permeable belt means and passing the belt means through a pressurized steam-heating zone provided with pressure sealing means at both the inlet and outlet thereof, whereby the beads are cohered into an integrated sheet through softening and re-expanding of the beads by steam-heating and the resultant sheet is thereafter cooled and separated from said belt means, the improvement which comprises:

a. wetting one surface of said circulating belt means,

b. depositing a mass of individual preliminarily expanded beads on said wetted surface of said circulating belt means

c. offering the angle of inclination of said circulating belt means so that

1. a portion of said deposited mass of individual beads will

adhere directly to said wetted belt surface to form a single layer of deposited beads thereon, and

2. the remainder of said deposited individual beads will fall off of said belt due to gravitational forces,

d. enclosing said single layer of deposited beads within said belt means,

e. subjecting said single layer of enclosed beads in the belt means to heat in said pressurized steam-heating zone and while doing so changing the direction of movement of said belt means a plurality of times within said steam heating zone during which time said layer of beads will be re-expanded and cohered into an integrated sheet in said steam-heating zone, the beads enclosed in said belt means being compressed in the direction of thickness of the enclosed layer of the beads due to the tension caused by the changing direction of the belt means, such tension preventing the enclosed layer of the beads from becoming unevenly thick by overlapping due to pushing up caused by hustling and jostling of said beads and permitting reexpansion of the beads only in the lateral direction thereof, and

f. recovering a soft and flexible uniformly thin foamed sheet of polystyrene.

3. In the known method for continuously producing a foamed sheet of polystyrene by enclosing preliminarily expanded beads of polystyrene in a circulating stream-permeable belt-means and passing the belt means through a pressurized steam heating zone provided with pressure sealing means at both the inlet and outlet thereof, whereby the beads are cohered into an integrated sheet through softening and re-expanding of the beads by steam heating and the resultant sheet is thereafter cooled and separated from said belt means, the improvement which comprises:

a. wetting each surface of the upper and lower cloth belts composing the circulating belt means,

b. depositing a mass of individual preliminarily expanded beads on each of said wetted cloth surfaces of said circulating belt means,

c. altering the angle of inclination of each of said cloth belts of the circulating belt means so that:

1. a portion of said deposited mass of individual beads will adhere directly to each of said wetted cloth belt surfaces to form a single layer of deposited beads on each of said surfaces, and

2. the remainder of said deposited individual beads will fall off from said cloth belts due to gravitational forces,

d. enclosing both of said single layers of deposited beads together within said belt means, so as to be overlapped on one another,

e. subjecting said overlapped layers of enclosed beads in the belt means to heat in said pressurized steamheating zone and while doing go changing the direction of movement of said belt means a plurality of times within said steam heating zone during which time said layers of beads will be re-expanded and cohered into an integrated sheet in said steam-heating zone, the beads enclosed in said belt means being compressed in the directions of thickness of the enclosed layer of the beads due to the tension caused by the changing direction of the belt means, such tension preventing the enclosed layer of the beads from becoming unevenly thick by overlapping due to pushing up caused by hustling and jostling of said beads and permitting re-expansion of the beads only in the lateral direction thereof, and

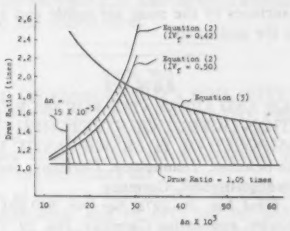
f. recovering a soft and flexible foamed sheet of polystyrene having a uniform thickness.

4,076,783

METHOD FOR PRODUCING POLYESTER FIBERS

Hiroshi Yasuda, and Susumu Omori, both of Otsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

Filed Dec. 13, 1974, Ser. No. 532,466
Claims priority, application Japan, Dec. 13, 1973, 48-140153
Int. Cl.[2] D01F 1/04
U.S. Cl. 264—78 **8 Claims**



1. A method for producing polyester fibers having excellent dyeability, and capable of being dyed with basic or disperse dyes at a temperature of less than 100° C. with no deterioration of said fibers, which comprises melt-spinning a polyester comprising predominantly repeating units of ethylene terephthalate and containing 0.5% by mol or more of an ester unit derived from a dicarboxylic acid or diol containing at least one metal sulfonate group under the condition of being highly oriented so as to give filaments having a birefringence (Δn) of 0.015 to 0.100 and drawing the resulting filaments at a temperature of less than the melting point of the polymer and satisfying the following equation (1):

$$100 \leqq T \leqq 4 \times (\Delta n \times 10^3) + 70 \quad (1)$$

wherein T is the drawing temperature (° C) and Δn is the birefringence of the filaments obtained after the melt-spinning, and at a draw ratio of from 1.05 times up to the maximum draw ratio of the following equations (2) and (3):

$$DR_{max_1} = \frac{1}{1.61 + 1.01(IV_f) - 0.0518(\Delta n \times 10^3)} + 0.5 \quad (2)$$

$$DR_{max_2} = \frac{30}{\Delta n \times 10^3 + 5} + 1.05 \quad (3)$$

wherein Δn is as defined above, DR_{max_1} and DR_{max_2} are each the maximum draw ratio, and IV_f is the intrinsic viscosity of the filaments obtained after the melt-spinning which is measured at 30° C in a mixed solvent of phenol:tetrachloroethane = 3:2.

4,076,784

PROCESS FOR COLOR AND SURFACE STABILIZATION IN FORMING WATER-EXTENDABLE POLYESTER RESIN PLASTICS AND THE LIKE

Maurice Wright Hart, Jr., and William Carlo Hart, both of 714 Anastia Ave., both of Coral Gables, Fla. 33055

Filed Feb. 9, 1976, Ser. No. 656,637
Int. Cl.[2] C08L 67/06
U.S. Cl. 264—102 **27 Claims**

1. A process for forming products from water-extendable polyester plastic resin chemically curable under the action of a catalyst, while stabilizing the texture and color of the surfaces of the product contacting the mold walls, that comprises, mixing the polyester plastic resin with water to extend the same into a homogeneous viscous mass while limiting air bubbles therein; adding and mixing curing catalyst into said mass to initiate the chemical curing of the same; inserting the curing mass into a mold having air-impervious side and bottom walls capable of exerting a substantial restraining pressure on the curing mass to prevent relative shrinkage at the interfaces

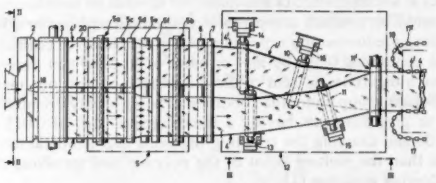
between the mass and the mold walls and having a side wall region spaced from the bottom wall and defining the periphery of a surface of the curing mass that is not restrained by the mold except at said periphery; developing, and maintaining as the cure continues, an adherent seal between at least said periphery and the adjacent side wall region of the mold to keep air from the interfaces between the mass and the mold walls; and breaking said seal when gelation of the mass has progressed to the point where the texture and color of the mold-contacting surfaces of the mass are stable and removing the plastic from the said mold.

4,076,785

METHOD OF AND APPARATUS FOR INCREASING THE PRODUCTION OUTPUT OF STRETCHED FLAT FILM WEBS COMPOSED OF THERMOPLASTIC MATERIAL

Willi Johann Schmidt, Taunusstein, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Jun. 26, 1975, Ser. No. 590,501
Claims priority, application Germany, Jun. 29, 1974, 2431385
Int. Cl.² B29D *7/24*
U.S. Cl. 264—146 **3 Claims**



1. In an improved method for increasing the production of stretched flat film webs of thermoplastic material in which a melt of thermoplastic material is extruded from a slot die, the melt is solidified to form a film, the film is transversely stretched, the stretched film is heat-set, the heat-set film is divided into narrower webs, and wound up,

the improvement comprising extruding the melt from a slot die wider than the die normally employed for the production of a preliminary film, which usually corresponds to the width of a transverse stretching frame, using an extruder having an output corresponding to the width of said wider die,

dividing the melt in the longitudinal direction into at least two films,

superposing the film webs so that they are in register and non-laminated,

transversely stretching said superposed non-laminated films,

heat-setting the superposed films,

separating the stretched and heat-set films into individual layers, and winding them up.

4,076,786

METHOD FOR PRODUCING CONTAINER LABEL BLANKS FROM A WEB

Stephen W. Amberg, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 526,124, Nov. 22, 1974, Pat. No. 4,013,496.
This application May 19, 1976, Ser. No. 687,730
Int. Cl.² B29D *7/22*
U.S. Cl. 264—146 **2 Claims**

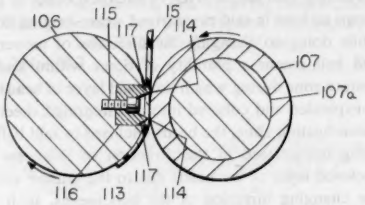
1. The method of handling a web of flexible organic thermoplastic material that is highly oriented along the longitudinal dimension of the web comprising

supplying a continuous web of said oriented material,

engaging the web by a cooperating pair of nip rolls and pulling the web forward in the longitudinal dimension thereof from the supply at a substantially constant speed,

penetrating one face of the moving web with a knife for slitting the web to partial depth along a line running in the longitudinal dimension of the web,

engaging the moving web between a cooperating pair of pleating rolls and compressing the material along a line for forming longitudinally spaced apart lateral pleats in the web extending across the web,



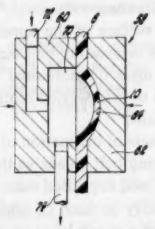
engaging the web thereafter on the surface of a drum, and driving the drum surface for advancing the web longitudinally at a speed in excess of the speed of the web for keeping the web in tension.

4,076,787

UNIVERSAL BATTERY CASE HAVING EMBOSSED INTERCELL PARTITIONS AND PROCESS FOR MAKING SAME

William W. Ervin, Sun City, Ariz., and Lee A. Fleck, Markleville, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 30, 1976, Ser. No. 718,464
Int. Cl.² B29C *17/00;* B29E *5/00*
U.S. Cl. 264—250 **2 Claims**



1. A process for making a multicell, thermoplastic, storage battery case having a plurality of individual compartments for containing the battery's electrochemically active cell elements, said process comprising the steps of: molding a case with substantially planar intercell partitions dividing said case into said compartments; softening localized portions of said partitions; and pushing said portions into said compartments so as to produce a plurality of bosses on said partitions for spacing said elements from said partitions and substantially centrally of said compartments.

4,076,788

MOLD COATING OF FRESHLY MOLDED ARTICLES

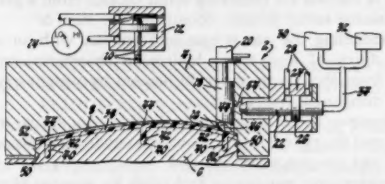
Edwin D. Ditto, Bloomfield Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 2, 1976, Ser. No. 746,865
Int. Cl.² B29D *9/00;* B29F *1/10*
U.S. Cl. 264—255 **2 Claims**

1. A method of molding a composite polymeric article comprising a substrate and a special purpose skin of predetermined thickness on a surface of said substrate, said method comprising the steps of:

molding said substrate between separable dies which coact in a first fully-closed position to define a mold cavity

corresponding in size and shape to said substrate, and nest one within the other to provide a polymer containment seal around said cavity;
allowing said substrate to harden in said cavity;
separating one of said dies from said surface of said substrate to provide a first gap therebetween which is greater than said predetermined thickness of said skin but insufficient to unnest said dies;
injecting a metered amount of skin-forming material into said gap in such a manner as to substantially hydraulically immobilize said substrate in said cavity during said separating, said amount being sufficient to provide said predetermined thickness but insufficient to fill said gap;



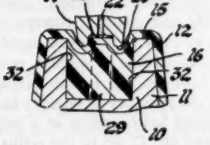
applying molding pressure to said one die to reduce said one gap to a second gap which is commensurate with said predetermined thickness, and to distribute said injected material substantially uniformly throughout said second gap and over said surface;
maintaining said pressure while said material bonds to said surface and solidifies sufficiently to permit complete separation of said dies without disruption of the skin thusly formed; and
completely separating said dies and removing said composite from said cavity.

4,076,789

METHOD OF FORMING AN EMBOSSED AND COATED DESIGN ON THE SURFACE OF A FORMABLE PLASTIC SHEET

Rodger E. Geller, Vandalia; Stanley E. Smith, Dayton, and Wayne A. Wilson, Kettering, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 12, 1976, Ser. No. 675,874
Int. Cl.[2] B29C *5/00;* B29D *9/08;* B29F *1/10*
U.S. Cl. 264—259 **2 Claims**



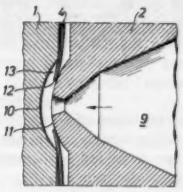
1. A method of forming an embossed design on a surface of a thermoformable plastic sheet and at substantially the same time forming a coating layer on at least a portion of the embossment, comprising the steps of
pressing a thermoformable plastic sheet, which has been heated to a thermoforming temperature, between an elastomeric anvil member and an embossing die, the die having a surface shaped to emboss a desired design in the surface of said sheet and to define a coating area on at least a portion of the embossment, the die having at least one passage connecting said surface with a source of liquid coating material,
restraining at least the portion of said elastomeric anvil member opposing said die while the sheet is being pressed so that the anvil is not displaced laterally from under the sheet but reacts to the pressure of the die by urging the sheet into substantially full contact with the embossing surface of the die to more faithfully reproduce the desired design,
forcing liquid coating composition through said passage against at least a portion of the embossed surface of the sheet, the force of the liquid pushing the sheet away from the die surface against the elastomeric anvil to deposit a layer of coating material in a desired pattern on the sheet, and thereafter
separating the embossing die and the anvil and removing the embossed and coated sheet.

4,076,790

METHOD OF EMBODYING A FOIL SHEET IN A THERMOPLASTIC OBJECT DURING THE PROCESS OF MANUFACTURING SAID OBJECT

Evald Torbjörn Gustav Lind, Silfverloodsgatan 9, S-461 00 Trollhattan, Sweden (S-461 00)

Continuation of Ser. No. 424,829, Dec. 14, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 609,057
Claims priority, application Sweden, Dec. 18, 1972, 16547/72
Int. Cl.[2] B29D *3/00;* B29C *6/02*
U.S. Cl. 264—266 **1 Claim**



1. A method of incorporating a sheet of foil in an object made from a thermoplastic material by injection moulding techniques during the process of making said object, said method comprising inserting foil piece between the plunger and die of an open mould in an injection moulding machine prior to the closing of the mould and to the injection of a moulding compound into the mould via an injection nozzle in said die, said foil piece being cut to size being inserted singularly between the open mould halves, said foil piece having a hole therein, said foil piece being inserted laterally between said mould halves from one side thereof at the same time as the mould is opened to eject a moulded object therefrom from the other side thereof, holding said foil piece in a localized position between the plunger and die so as to substantially cover the free end of the plunger with the hole facing said free end and the injection nozzle in the die, the foil piece having at least one flap projecting outside the end surface of the plunger, closing the mould while transporting the foil piece into the mould between the plunger and die so that the foil piece is bent to shape as the flap is folded into the die and located along one side portion of the plunger, said die being formed with a convex protrusion at said injection nozzle facing a central recess formed in the plunger such that when the mould is closed the convex protrusion on the die comes into contact with the edge of the foil surrounding the hole to displace the foil edge into the recess in the plunger while pressing the foil into contact with the plunger at the edge of said recess, injecting moulding compound into the mould through the injection nozzle in the die and through the hole in the foil piece, the foil piece being moved into abutment with the die by the influence of the moulding compound acting on said foil piece as a result of contact of the foil piece around the hole with the convex protrusion of the die around the injection nozzle, the flow of moulding compound from the nozzle being so deflected by the recess in the plunger, that said moulding compound is guided outwardly towards the foil piece away from the hole edge, so that the foil piece is caused to adopt a position on the outside

of the moulding compound so as to adhere to said compound as a result of the heat and pressure exerted therefrom while cooling a mould portion abutting the foil piece so as to avoid damage to said foil piece.

4,076,791

MOLDS FOR ENCAPSULATING ELECTRICAL COMPONENTS

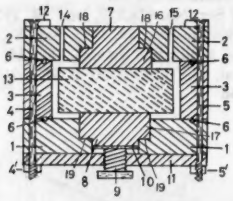
Frederick William Barter, Newmarket, and Peter James Douglas Victor Brett, Sawston, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 1, 1976, Ser. No. 691,968

Claims priority, application United Kingdom, Jun. 4, 1975, 24062/75

Int. Cl.[2] B22D *19/00;* **B29C** *6/04;* **B29F** *1/10*

U.S. Cl. 264—272 **9 Claims**



1. A mold for encapsulation of a component with a thermosetting resin composition which comprises

i. a rigid outer case provided with means for introduction and removal of the component,

ii. fitted into opposing walls of the case, at least one pair of solid plugs of a flexible material, the plugs extending beyond the inner face of the walls into the interior of the mold and being constructed of a material having a higher coefficient of cubic expansion than that of which the mold is constructed,

iii. detent means present in said opposing walls for engaging said plugs and preventing their movement in a direction opposite to the position of said component, and

iv. means located in the wall of the case for advancing at least one such plug towards the center of the mold to grip the component,

the plugs expanding to retain substantially their grip on the component when the mold is heated.

4,076,792

CATALYST SYSTEMS FOR THE REDUCTION OF THE OXIDES OF NITROGEN

Gordon F. Foster, Campbell; Helmuth E. Meissner, and Janice L. Stiles, both of Painted Post, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 12, 1972, Ser. No. 243,255

Int. Cl.[2] B01D *53/00*

U.S. Cl. 423—213.5 **3 Claims**

1. A process for treating the exhaust gases from an internal combustion engine to obtain the reduction of the oxides of nitrogen therein while suppressing the formation of ammonia by-products during said reduction which comprises contacting said exhaust gases prior to the introduction of air or neutralizing fuel gases thereto with a catalytic device comprising a monolithic refractory support structure of the honeycomb type supporting on the surface thereof a mixed noble metal catalyst consisting essentially, in weight percent, of 10–70% iridium and the remainder noble metals selected from the group consisting of platinum, palladium, and mixtures thereof, said mixed noble metal catalyst making up about 0.1–0.5% by weight of said support structure, said engine being operated at a substoichiometric air-to-fuel ratio ranging from 90% of stoichiometric up to but not including a stoichiometric ratio to maintain an overall reducing gaseous environment, said exhaust gases being passed through said support structure at a space velocity in the range of about 15,000–200,000 hr.$^{-1}$, and said exhaust gases being at a temperature at least sufficient to initiate the catalytic reduction of the oxides of nitrogen upon contact with said mixed noble metal catalyst.

4,076,793

METHOD FOR SULFUR DIOXIDE CONTROL

William L. Nikolai, Rte. 4, Box 80, Platteville, Wis. 53818

Filed Jan. 22, 1976, Ser. No. 651,239

Int. Cl.[2] C01B *17/00;* **B01J** *8/00*

U.S. Cl. 423—242 **15 Claims**

1. A method for removing sulfur dioxide from a gas stream containing sulfur dioxide, comprising the steps of

conducting the gas stream into contact with an aqueous slurry of manganous hydroxide absorbant comprising from about 1 to about 30 percent by weight crystalline manganous hydroxide

absorbing and oxidizing sulfur dioxide from the gas stream in said slurry to convert manganous hydroxide in said slurry into manganous sulfate, and

regenerating manganous hydroxide by aqueous phase electrochemical precipitation from said manganous sulfate for sulfur dioxide absorbant reuse.

4,076,794

PROCESS FOR THE PRODUCTION OF HIGH PURITY ALKALI METAL TETRAHALOALUMINATES AND PRODUCTS PRODUCED THEREBY

William Novis Smith, Exton, Pa., assignor to Foote Mineral Company, Exton, Pa.

Filed Aug. 1, 1974, Ser. No. 493,568

Int. Cl.[2] C01D *3/00;* **C01F** *7/04, 7/48*

U.S. Cl. 423—463 **13 Claims**

1. A process for the production of high purity alkali metal tetrahaloaluminates of the formula

$$M_xM'_zM''_{1-(x+z)}AlX_{4-(y+w)}X'_yX''_w$$

wherein M, M′ and M″ are different alkali metals of the group consisting of Na, K and Li, X, X′ and X″ are different halogens of the group consisting of Cl, Br and I, the values of x and z range from 0 up to 1 and $[1-(x+z)]+x+z$ is about 1, the values of y and w range from 0 up to about 4 and $[4-(y+w)]+y+w$ is about 4, which comprises:

(a) reacting an aluminum halide selected from the group consisting of aluminum chloride, aluminum bromide, aluminum iodide and mixtures thereof with at least the stoichiometric amount of an alkali metal halide selected from the group consisting of sodium, potassium and lithium chloride, bromide and iodide, mixtures and double salts thereof in the presence of powdered aluminum metal and a stable liquid hydrocarbon at a temperature in the range from about 60° C. up to the reflux temperature of the reaction mixture,

(b) filtering the hot reaction mixture to remove the aluminum metal and other solids,

(c) cooling the filtrate to below about 30° C., and

(d) separating the resulting crystals of substantially pure alkali metal tetrahaloaluminate from the filtrate; the entire process being carried out under anhydrous conditions and an inert atmosphere.

4,076,795

HYDROSULFITE PRODUCTION

Jack A. Tiethof, South Plainfield, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Filed Sep. 9, 1976, Ser. No. 721,875

Int. Cl. C01B *17/66*

U.S. Cl. 423—515 **13 Claims**

1. In a process for producing iron hydrosulfite liquor by

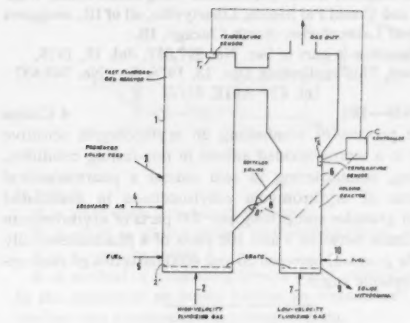
reacting particulate metallic iron with a strongly acidic aqueous solution of sulfur dioxide at a low temperature, the improvement which comprises: adding a base selected from the group consisting of sodium hydroxide and sodium carbonate to said aqueous solution of sulfur dioxide in amount within the range of about 0.05 to less than 0.3 equivalent of said base per mole SO_2 before contacting the solution of sulfur dioxide with said iron, reacting said iron with said solution of sulfur dioxide containing said base at −3° to 15° C. to form iron hydrosulfite liquor and thereafter immediately adding a base selected from the group consisting of sodium hydroxide and sodium carbonate to said iron hydrosulfite liquor to increase the pH to a value at which decomposition is significantly retarded, thereby producing stabilized iron hydrosulfite liquor.

4,076,796

CARRYING OUT ENDOTHERMIC PROCESSES IN FAST FLUIDIZED REACTOR WITH CONVENTIONALLY FLUIDIZED HOLDING REACTOR

Lothar Reh, Bergen-Enkheim; Hans-Werner Schmidt, Frankfurt am Main, and Ludolf Plass, Kronberg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 27, 1976, Ser. No. 690,525
Claims priority, application Germany, Jun. 3, 1975, 2524540
Int. Cl.[2] B01J *8/26*
U.S. Cl. 423—659 **11 Claims**



1. In a method of carrying out an endothermic process involving a solid other than the thermal decomposition of aluminum chloride hydrate followed by calcination, wherein solids capable of endothermic reaction are treated in a fast fluidized-bed reactor supplied with secondary air introduced by an inlet at a level above a gas distributor, particles of the solids are entrained from the bed in a gas stream, and said particles are separated from the gas stream and are at least in part returned to the fast fluidized-bed reactor, the improvement which comprises:

(a) introducing the gas stream together with the entrained particles from said fast fluidized-bed reactor into a holding reactor for separation in an upper position thereof;

(b) fluidizing the separated particles in said holding reactor in a bed with a fluidizing gas introduced into said holding reactor at a velocity such that the solids occupy at least 35% of the volume of the bed of said holding reactor;

(c) feeding particles from an overflow point of a lower portion of said holding reactor via a descending passage into said fast fluidized-bed reactor in a recirculation cycle at a rate sufficient to maintain a predetermined density of solids in said fast fluidized-bed reactor, said predetermined density of the solids in said fast fluidized-bed reactor corresponding to a solids volume of 2 to 20% of the volume of said fast fluidized-bed reactor between said gas distributor and said level and to a solids volume of 0.2 to 2% of the volume of said fast fluidized-bed reactor above the secondary-air inlet;

(d) withdrawing particles from the cycle formed by said fluidized-bed reactor and said holding reactor in a partial stream;

(e) maintaining the particles in said holding reactor for a residence time in excess of the residence time of the solids in said fast fluidized-bed reactor; and

(f) maintaining a substantially constant temperature in both said reactors by regulating the rate at which particles are fed in step (c) from said holding reactor to said fast fluidized-bed reactor, said rate being regulated by varying the flow cross section of said passage between said overflow point and a low point of said fluidized-bed reactor.

4,076,797

RADIOIMMUNOASSAY

Raymond Vincent Davis, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sep. 28, 1976, Ser. No. 727,548
Int. Cl.[2] A61K *43/00*; G01N *33/16*
U.S. Cl. 424—1 **3 Claims**

1. An indirect, solid phase radioimmunoassay for syphilis comprising the steps of

(a) fixing *Treponema pallidum* reiter variant to the inner surface of a test tube,

(b) dispensing test samples of human serum diluted with a sorbent containing group specific antibody binders into the test tube in contact with the *Treponema pallidum* reiter variant and incubating,

(c) washing the inner surface of the test tube to remove unreacted elements of the test sample,

(d) dispensing ^{125}I antihuman gamma globulin into the test tube in contact with the antigenic surface and incubating,

(e) washing the inner surface of the test tube to remove unreacted ^{125}I antihuman gamma globulin,

(f) measuring the radioactivity in the test tube and comparing to a standard to determine the presence or absence of syphilis.

4,076,798

HIGH MOLECULAR WEIGHT POLYESTER RESIN, THE METHOD OF MAKING THE SAME AND THE USE THEREOF AS A PHARMACEUTICAL COMPOSITION

Donald J. Casey, Ridgefield, and George C. Gleckler, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 582,001, May 29, 1975, which is a division of Ser. No. 418,138, Nov. 21, 1973, abandoned. This application Nov. 2, 1976, Ser. No. 737,940
Int. Cl.[2] A61K *47/00*
U.S. Cl. 424—22 **4 Claims**

1. A pharmaceutical composition for the controlled continuous administration of a predetermined dosage of a drug to a living animal comprising a normally solid biodegradable, hydrolyzable polyester resin of diglycollic acid and an unhindered glycol, having a molecular weight sufficiently high so as to provide a polymeric material possessing self-supporting film forming properties, which has dispersed uniformly throughout said polyester resin, a drug formulation.

4,076,799

METHOD OF INHIBITING SKIN IRRITATION

Sharon Gail Willer, Loveland; Paul Ronald Yust, and Ralph Kelly, both of Cincinnati, all of Ohio, assignors to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Dec. 27, 1972, Ser. No. 319,030
Int. Cl.[2] A61L *9/04*; A61K *31/205, 31/20, 31/23*
U.S. Cl. 424—45 **16 Claims**

1. A method for preventing or reducing irritation of the skin caused by contact with a skin irritating allergenic agent which comprises applying to the skin of a subject sensitized to said

allergenic agent, prior to contact with said skin irritating allergenic agent, a protective agent containing at least two polar groups separated by a chain of at least 15 atoms, the majority of which are carbon atoms; wherein said protective agent is the unsaturated polymerized product obtained from the polymerization of 2 to 4 molecules of a monomeric ethylenically unsaturated C_{12} to C_{26} fatty acid or the saturated derivative product of said polymerized product, said polymerized product or saturated derivative thereof containing instead of 2 to 4 carboxy groups carboxyl salt groups; said irritation of the skin being an allergic contact dermatitis, said skin irritating allergenic agents being allergic contact dermatitis producing agents and said protective agent being present in an amount effective to reduce skin irritation compared to skin irritation produced in the absence of said protective agent.

4,076,800

PROTEIN-CONTAINING DETERGENT COMPOSITIONS FOR PROTECTING KERATINOUS MATERIALS

Robert Anthony Marsh, Newcastle-upon-Tyne, England; Gordon John Mackie, Strombeek-Bever, and Peter Hale, Tervueren, both of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 7, 1976, Ser. No. 647,245

Claims priority, application United Kingdom, Jan. 13, 1975, 1319/75

The portion of the term of this patent subsequent to Sep. 14, 1993, has been disclaimed.

Int. Cl.² A61K *7/06, 7/48*

U.S. Cl. 424—70 **8 Claims**

1. A composition for protecting keratinous material from the deleterious effects of detergents or from adverse climatic conditions, said composition comprising

(a) from 0.1 to 90% by weight of a foaming non cationic detergent material; and

(b) from 0.1 to 20% by weight of a chemically modified protein having an isoionic point (pI) less than pH of 6, said chemically modified protein being selected from the group consisting of oxybutylated hydrolyzed protein and acetylated hydrolyzed protein.

4,076,801

IMMUNOSTIMULANT AGENT, COMPOSITIONS THEREOF AND METHODS FOR THEIR PREPARATION

Robert Fauve, Sevres, France, assignor to Institut Pasteur, Paris, France

Continuation of Ser. No. 317,022, Dec. 20, 1972, abandoned. This application May 2, 1975, Ser. No. 573,925

Int. Cl.² A61K *39/02, 39/04*

U.S. Cl. 424—92 **33 Claims**

1. Method for the extraction of a chloroform-soluble immunostimulant agent effective for the control of pathogenic bacteria, comprising forming a suspension of bacteria with a mixture of solvents containing a halogenated hydrocarbon and alcohol, both selected from those capable of dissolving a soluble fraction containing the immunostimulant agent from the cells, separating the insoluble fractions, evaporating the soluble fraction under reduced pressure and at reduced temperature, taking up the solid residue again in chloroform and recovering the chloroform solution containing the above-mentioned immunostimulant agent by filtration.

4,076,802

ANTIBIOTIC X-4357B

John Westley, Cedar Grove, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 30, 1977, Ser. No. 782,680

Int. Cl.² A61K *35/74*

U.S. Cl. 424—122 **2 Claims**

1. Antibiotic X-4357B which has a melting point of 179–180° C., a molecular weight of 891, elementary analysis values of C 63.18%, N 1.53% and methoxyl 6.98%, the field desorption mass spectrograph illustrated in FIG. 1, the nuclear magnetic resonance curve illustrated in FIG. 2 and the infrared curve illustrated in FIG. 3 hereof.

4,076,803

SYNERGISTIC COMBINATION OF METAL PROTEINATES WITH BETA-CHLOROVINYL DIALKYL PHOSPHATES

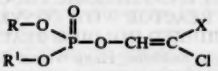
Harvey H. Ashmead, 719 E. Center Street, Kaysville, Utah 84037

Filed Mar. 15, 1976, Ser. No. 666,868

Int. Cl.² A61K *37/00, 31/66*

U.S. Cl. 424—177 **17 Claims**

1. A synergistic mixture for increasing the metal uptake of essential bivalent metals into the tissues of a mammal comprising an effective amount of a bivalent metal proteinate and a beta-chlorovinyl dialkyl phosphate of the formula



wherein R and R^1 are the same or different alkyl groups having from 1 to 4 carbon atoms and X is either hydrogen or chlorine.

4,076,804

ERYTHROMYCIN THERAPY

Robert E. Singiser, Gurnee; Alexander Hing Chinn Chun, Waukegan, and Shashi Pal Mehta, Libertyville, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Continuation-in-part of Ser. No. 597,057, Jul. 18, 1975, abandoned. This application Dec. 13, 1976, Ser. No. 749,637

Int. Cl.² A61K *31/71*

U.S. Cl. 424—181 **4 Claims**

1. The process of combatting an erythromycin sensitive infection in a warm-blooded animal in non-fasting condition, comprising, administering to said animal a pharmaceutical preparation of erythromycin ethylsuccinate in granulated form, said granules comprising per 100 parts of erythromycin ethylsuccinate between 3 and 100 parts of a pharmaceutically acceptable gum and between 20 and 4000 parts of a physiologically acceptable sugar.

4,076,805

UTERO-EVACUANT EXTRACTS FROM PLANT SUBSTANCES

Jose Luis Mateos; Luis Noriega, both of Mexico City, Mexico; Richard E. Huettemann, Hazlet, and Ramesh M. Kanojia, Somerville, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 489,688, Jul. 18, 1974, Pat. No. 3,996,132. This application May 27, 1976, Ser. No. 690,765

Int. Cl.² A61K *35/78*

U.S. Cl. 424—195 **5 Claims**

1. A composition of matter obtained from extracts containing utero-evacuant materials present in the zoapatle plant and obtained by:

a. treating said extract with a water-immiscible organic solvent,

b. treating the resulting solution with an aqueous solution of a mild base to remove water soluble and acidic impurities,

c. passing the materials soluble in the organic phase at least once over a chromatographic column of adsorbent material selected from silica gel, alumina, polymeric copolymers and florisil to separate from said phase said materials, and

d. eluting the column with a second solvent or a mixture of solvents, said composition having the following physical constants:

I.R. 2.91μ, 5.89μ, 5.95μ

N.M.R. $_{TMS}^{CDCl_3}$ 5.47, 5.29, 4.14, 4.11, 3.53, 3.15, 1.75, 1.62, 1.14, 1.08 ppm.

3. A method of interrupting pregnancy which comprises administering to a female animal an effective amount of the purified material of claim 1.

4. A method of treating disorders of the central nervous system in mammals which comprises administering an effective amount of the purified material of claim 1 to said mammal.

4,076,806

O-ALKYL-S-[3-OXO-1,2,4-TRIAZOLOBENZOPYRAZIN-(2)YL-METHYL]-(THIONO)THIOLPHOSPHORIC(PHOSPHONIC) ACID ESTERS

Walter Lorenz, deceased, late of Wuppertal, Germany (by Erika Lorenz, heiress); Ingeborg Hammann, Cologne, Germany; Bernhard Homeyer, Leverkusen, Germany, and Wilhelm Stendel, Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

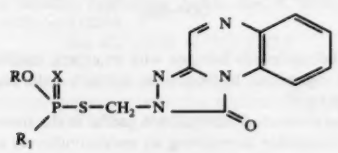
Filed Mar. 24, 1976, Ser. No. 669,781

Claims priority, application Germany, Apr. 11, 1975, 2515794

Int. Cl.[2] C07F *9/40, 9/165;* A01N *9/36*

U.S. Cl. 424—200 10 Claims

1. An O-alkyl-S-[3-oxo-1,2,4-triazolobenzopyrazin-(2)ylmethyl]-(thiono)thiolphosphoric(phosphonic) acid ester of the formula



in which

R is alkyl with 1 to 4 carbon atoms,

R_1 is alkyl or alkoxy with 1 to 4 carbon atoms, and

X is oxygen or sulfur.

9. A method of combating insects which comprises applying to the insects or an insect habitat an insecticidally effective amount of a compound according to claim 1.

4,076,807

PHOSPHITE-BASED FUNGICIDE COMPOSITIONS

Stephane Trinh, Champagne-au-Mont d'Or; Alain Moraly, Lyon, and Jean-Michel Gaulliard, Orlienas, all of France, assignors to Philagro S.A., France

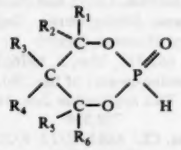
Filed Oct. 7, 1975, Ser. No. 620,379

Claims priority, application France, Oct. 8, 1974, 74 34529

Int. Cl.[2] A01N *9/36*

U.S. Cl. 424—209 4 Claims

1. A process for the protection of plants against fungal diseases which comprise applying to said plants a fungicidally effective amount of at least one dioxaphosphorinane of the formula



in which each R_1, R_2, R_3, R_4, R_5 and R_6 may be identical or different and represent hydrogen, an alkyl radical, or a halogenated alkyl radical containing from 1 to 5 carbon atoms.

4,076,808

O,S-DIALKYL-O-(N-METHOXY-BENZIMIDOYL)-THIONOTHIOL PHOSPHORIC ACID ESTERS AND ARTHROPODICIDAL USE

Walter Lorenz, Wuppertal, and Ingeborg Hammann, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

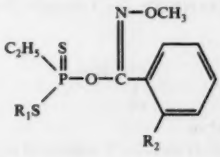
Filed Sep. 9, 1976, Ser. No. 721,725

Claims priority, application Germany, Oct. 10, 1975, 2545392

Int. Cl.[2] A01N *9/36;* C07F *9/40*

U.S. Cl. 424—211 7 Claims

1. An O,S-dialkyl-O-(N-methoxy-benzimidoyl)-thionothiolphosphoric acid ester of the formula



in which

R^1 is alkyl with 3 or 4 carbon atoms, and

R^2 is hydrogen or nitro.

4,076,809

PHOSPHONOUREIDE AND PHOSPHONOTHIOUREIDE ANTHELMINTICS

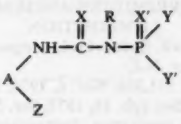
W. David Weir, Levittown, and Edward E. Kilbourn, Chalfont, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Oct. 28, 1975, Ser. No. 625,998

Int. Cl.[2] A01N *9/36;* C07F *9/02;* A61K *31/66*

U.S. Cl. 424—211 25 Claims

1. A compound of the formula:



wherein

A is a divalent arylene group optionally substituted with

a. halogen;

b. cyano;

c. nitro;

d. di(C_1-C_{18}) alkylamino;

e. vicinal alkylene of from 2 to 6 carbon atoms; or

f. a group of the formula:

$$R^1(A')_a$$

wherein

R^1 is

1. an alkyl group of from 1 to 4 carbon atoms;

2. a substituted or unsubstituted aromatic group containing from 6 to 10 carbon atoms in the aromatic ring;

A' is oxygen, sulfur, sulfinyl, sulfonyl or carbonyl; and *a* is an integer of 0 to 1;

R is

a. hydrogen;

b. (C_1-C_{10}) alkyl;

c. (C_1-C_{10}) haloalkyl;

d. (C_3-C_6) cycloalkyl;

e. (C_2-C_{11}) alkoxyalkyl;

f. (C_1-C_{10}) cyanoalkyl;

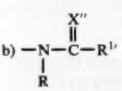
g. (C_3-C_6) alkenyl;

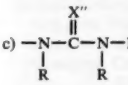
h. (C_3-C_6) haloalkenyl;

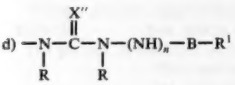
i. (C_3-C_6) alkynyl;

j. (C_3-C_6) haloalkynyl;
k. optionally substituted aralkyl of up to 11 carbon atoms;
l. substituted or unsubstituted (C_6-C_{10}) aryl;
Y is R′, OR′, $N(R')_2$ or SR′ and
Y′ is OR′, $N(R')_2$ or SR′ wherein R′ is alkyl (C_1-C_4), substituted alkyl (C_1-C_4), aralkyl (C_7-C_{10}), alkenyl (C_1-C_4), substituted alkenyl (C_1-C_4), phenyl, substituted phenyl, naphthyl or substituted naphthyl
X is oxygen or sulfur; X′ is oxygen or sulfur; and Z is a group of the formula:

a) $-NH_2$, provided X is oxygen;

b) 

c) 

d) 

wherein

R and R^1 are as defined above; *n* is an integer of 0 to 1; B is carbonyl, sulfinyl, or sulfonyl; Q is alkylene of from 2 to 4 carbon atoms; and X″ is oxygen or sulfur, provided that when X″ is sulfur, X is oxygen; or a pharmacuetically acceptable salt of said compound.

4,076,810
BENZYLPYRIMIDINE ANTIBACTERIAL COMPOSITION

Ivan Kompis, Oberwil, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 521,384, Nov. 6, 1974, Pat. No. 4,024,145. This application Feb. 18, 1977, Ser. No. 769,971
Claims priority, application Switzerland, Nov. 8, 1973, 15680/73; Oct. 24, 1974, 14243/74
Int. Cl.² A61K *31/625, 31/505*
U.S. Cl. 424—229 **1 Claim**

1. An antibacterial pharmaceutical composition comprising an antibacterially effective amount of one part by weight of 2,4-diamino-5-(4-bromo-3,5-dimethoxybenzyl)-pyrimidine to 1 to 40 parts by weight of an antibacterially active sulfonamide and a carrier.

4,076,811
NOVEL AGENTS AND METHODS FOR TREATMENT OF CLIMACTERIC DISTURBANCES

Ursula Lachnit-Fixson, and Friedmund Neumann, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Berkamen, Germany

Filed Jun. 23, 1976, Ser. No. 699,192
Claims priority, application Germany, Jun. 30, 1975, 2529523
Int. Cl.² A61K *31/56*
U.S. Cl. 424—239 **5 Claims**

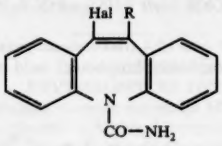
1. A method of alleviating the physiological and psychological disturbances of menopause comprising administering for about 21 successive days to a female afflicted therewith a first course of dosage units, in admixture with a pharmaceutically acceptable carrier, of an estradiol estrogen and an estriol estrogen in a ratio of about 1 : 1 to about 1 : 10, wherein the estradiol estrogen in each daily dosage unit corresponds in activity to 0.5 –2 mg. of estradiol valerate, followed by about 7 days without hormone administration, with administration of a placebo, or with successive daily administration of the same or different estratriol estrogen, in admixture with a pharmaceutically acceptable carrier, corresponding in activity to 1 –8 mg. of estriol.

4,076,812
10-HALOGENO- OR 10,11-DIHALOGENO DERIVATIVES OF 5H-DIBENZ[b,f]AZEPINE

Hans Allgeier, Haagen, Germany, and Erich Schmid, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

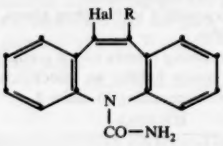
Filed Sep. 22, 1975, Ser. No. 615,256
Claims priority, application Switzerland, Sep. 27, 1974, 13095/74
Int. Cl.² A61K *31/55;* **C07D** *223/22*
U.S. Cl. 424—244 **15 Claims**

1. A compound 5H-dibenz[b,f]azepine of formula I


(I)

wherein Hal represents halogen with an atomic number up to 35 and R represents hydrogen or halogen with an atomic number up to 35.

8. A pharmaceutical composition useful in the treatment of states of convulsion comprising an anticonvulsively effective amount of a compound according to claim 1 and having the formula I


(I)

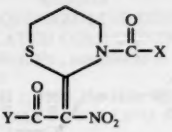
wherein Hal represents halogen with an atomic number up to 35 and R represents hydrogen or halogen with an atomic number up to 35 together with pulverulent carriers or a suppository base composition.

4,076,813
DERIVATIVES OF 3-OXOMETHYL-2-(1-NITRO-2-OXOETHYLIDENE)-TETRAHYDRO-2H-1,3-THIAZINES AS INSECTICIDES

Steven A. Roman, Oakdale, Calif., and James E. Powell, Rodmersham Green near Sittingbourne, England, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 663,317, Mar. 3, 1976, Pat. No. 4,022,775, which is a continuation-in-part of Ser. No. 564,258, Apr. 2, 1975, abandoned. This application Jan. 14, 1977, Ser. No. 759,598
Int. Cl.² A01N *9/12, 9/22*
U.S. Cl. 424—246 **2 Claims**

1. A method for killing flies, aphids, and insects of the genus Heliothis, which comprises contacting such insects with a dosage that is lethal to them of a compound of the formula:



wherein X and Y each is R, R—O— or R—S, R containing up to 30 carbon atoms and being alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, haloalkyl, haloalkenyl, mono-and poly(alkoxy)alkyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl; phenyl, or phenalkyl, or any of these substituted on the ring by one to two of one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy or phenoxy; is aminoalkyl, $-(CH_2)_mNR^1R^2$, wherein m is 1 or 2, R^1 and R^2 each is alkyl, alkenyl, cycloalkyl, phenyl or phenalkyl; or is $-(CH_2)_nR^5$, wherein n is 0, 1 or 2, and R^5 is a heterocyclic moiety selected from furanyl, tetrahydrofuranyl, dioxolanyl, thienyl, thiopyranyl, pyridinyl, pyrrolidinyl and morpholinyl.

4,076,814

PREVENTIVE AND CURATIVE COMPOSITIONS AGAINST MYCOPLASMOSIS

Isao Seki; Noritoshi Kitano, and Fusao Kondo, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

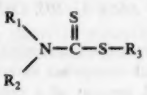
Filed May 28, 1976, Ser. No. 690,863

Claims priority, application Japan, Jun. 9, 1975, 50-69324; Oct. 1, 1975, 50-118580

Int. Cl.[2] A61K *31/535, 31/54*

U.S. Cl. 424—248.5 **12 Claims**

1. A preventive and curative composition against mycoplasmosis which comprises an effective amount of an active ingredient a compound having the formula

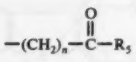


wherein

R_1 and R_2 form, jointly with the nitrogen atom to which they are attached, a 6-membered heteroalicyclic ring which also contains oxygen as another hetero atom and which may be substituted with alkyl of 1 to 4 carbon atoms; and

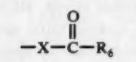
R_3 is a group $—CH_2—R_4$ in which R_4 is a 5–7 membered 2-oxocycloalkyl group optionally substituted with 1–3 C_1–C_4 alkyl groups;

a group



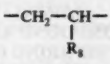
in which n is an integer of 1 or 2 and R_5 is naphthyl group, a phenyl group optionally substituted with 1–2 groups selected from the group consisting of hydroxy, C_1–C_{12} alkyl, C_1–C_4 alkoxy, nitro and halogen or a 5–7 membered heterocyclic group which has as hetero atom 1 or 2 atoms of oxygen atom, nitrogen atom and sulfur atoms and may be substituted with 1–3 groups selected from the group consisting of C_1–C_4 alkyl, hydroxy, hydroxymethyl, halogenomethyl, dihalogenomethyl, trihalogenomethyl, nitro and halogen;

a group



in which R_6 is an alkyl group of 1 to 12 carbon atoms, a 5–6 membered cycloalkyl group, an aralkyl group which has 6 or 10 carbon atoms in the aryl moiety and 1 to 4 carbon atoms in the alkyl moiety and may be substituted with C_1–C_4 alkyl, hydroxy, nitro, C_1–C_4 alkoxy or halogen or an alkenyl group of 2 to 5 carbon atoms which may be substituted with cycloalkenyl or phenyl, said phenyl being optionally substituted with C_1–C_4 alkyl, hydroxy, nitro, C_1–C_4 alkoxy or halogen and X is a group

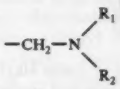
wherein R_7 is hydrogen, C_1–C_{12} alkyl, cyclohexyl, aralkyl of C_6 or C_{10} in the aryl moiety and C_1–C_4 in the alkyl moiety, C_2–C_4 alkenyl, C_2–C_3 alkynyl or phenyl or a group



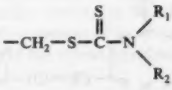
wherein R_8 is hydrogen, C_1–C_{12} alkyl, cyclohexyl, aralkyl of C_6 or C_{10} in the aryl moiety and C_1–C_4 in the alkyl moiety, said aryl moiety being optionally substituted with C_1–C_4 alkyl, hydroxy, C_1–C_4 alkoxy or halogen, or phenyl optionally substituted with C_1–C_4 alkyl, hydroxy, C_1–C_4 alkoxy or halogen; or

a group

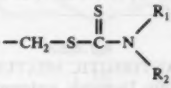
in which R_9 is hydrogen atom, an alkyl group of 1 to 4 carbon atoms, cyclohexyl group or phenyl group and R_{10} is a phenyl group which has one hydroxy group at the o- or p-position and 2–4 groups selected from the group consisting of C_1–C_4 alkyl, halogen, C_1–C_4 alkoxy, C_2–C_4 alkenyl, hydroxyalkyl of C_1–C_4, a group



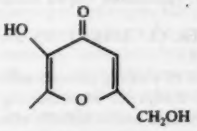
wherein R_1 and R_2 are as defined above and a group



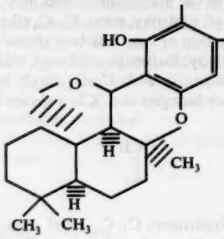
wherein R_1 and R_2 are as defined above, a naphthyl group which has one hydroxy group at the 1- or 2-position and optionally halogen or a group



wherein R_1 and R_2 are as defined above, a group



or a group



or a salt thereof and an inert carrier.

4,076,815

QUINOXALINE COMPOUND AND COMPOSITION, PROCESS FOR PREPARING COMPOUND, AND METHOD OF COMBATTING CHOLERA THEREWITH

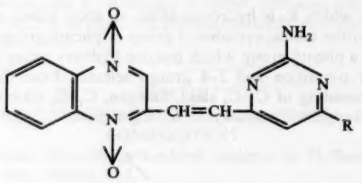
Aldo Garzia, Lodi (Milano); William Ferrari, Modena, and Andrea Bottazzi, Lodi, all of Italy, assignors to Istituto Chemioterapico Italiano, S.p.A., Italy

Continuation-in-part of Ser. No. 672,123, Mar. 31, 1976, abandoned. This application Feb. 23, 1977, Ser. No. 771,118

Int. Cl.[2] A61K *31/505;* **C07D** *403/06*

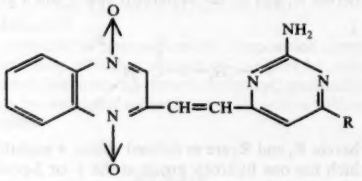
U.S. Cl. 424—251 **29 Claims**

11. A method of combatting cholera by administration to an individual exposed to a cholera-producing organism an effective amount of a substituted quinoxaline represented by the formula



wherein R is hydrogen or lower alkyl of 1 to 5 carbon atoms.

20. A quinoxaline compound represented by the formula



where R is hydrogen or lower alkyl of 1 to 5 carbon atoms.

4,076,816

ANTIBIOTIC MIXTURE

Leif Tybring, Gentofte, Denmark, assignor to Leo Pharmaceutical Products Ltd. A/S, Ballerup, Denmark

Filed May 1, 1975, Ser. No. 573,453

Claims priority, application United Kingdom, May 17, 1974, 22171/74

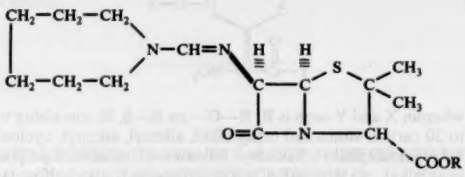
Int. Cl.[2] A61K *31/305, 31/43*

U.S. Cl. 424—251 **13 Claims**

13. The method of treating patients suffering from bacterial infections which comprises administering by the parenteral route to the patients, in antibacterially effective amounts, dosage units of an antibacterial synergistic composition consisting essentially of a mixture of:

An amidinopenicillanic acid derivative of the general formula

I



in which R is hydrogen, or its pharmaceutically acceptable non-toxic salts, in combination with trimethoprim, or pharmaceutically acceptable non-toxic salts thereof, which composition contains amounts of the active ingredients so as to provide a ratio of 1:19 to 19:1 when used in the body.

4,076,817

CERTAIN THIAZOLO COMPOUNDS AS ACARICIDAL AGENTS

Richard M. Acheson, Oxford; Ian R. Cox, North Harrow; John K. Stubbs, and Alexander B. Penrose, both of Deal, all of England, assignors to Pfizer Inc., New York, N.Y.

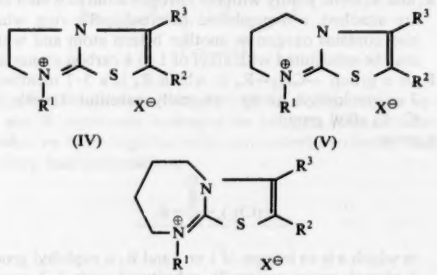
Filed Nov. 2, 1976, Ser. No. 738,382

Claims priority, application United Kingdom, Nov. 5, 1975, 45961/75; Nov. 5, 1975, 45962/75

Int. Cl.[2] A61K *31/505;* **C07D** *239/70*

U.S. Cl. 424—251 **5 Claims**

1. A method for protecting an animal subject to skin infection by acarids which comprises externally applying to said animal an acaricidal amount of a compound selected from those of the formulae (IV), (V) and (VI),



(IV) (V)

(VI)

wherein X^- is a pharmaceutically acceptable anion; R^1 is an alkyl group having from 10 to 20 carbon atoms; when taken separately, each of R^2 and R^3 is selected from the group consisting of hydrogen, alkyl having from one to six carbon atoms, phenyl and phenyl substituted by up to two members which may be the same or different and are selected from the group consisting of fluoro, chloro, bromo, hydroxyl, alkyl having from one to three carbon atoms, alkoxy having from one to three carbon atoms, cyano, nitro and trifluoromethyl, and when R^2 and R^3 are taken together they form a tetramethylene group; with the proviso that in formula (IV) R^2 is other than hydrogen, phenyl or said substituted phenyl and R^3 is other than hydrogen.

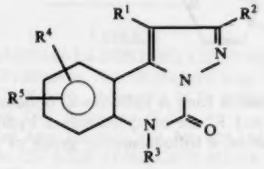
4,076,818

PYRAZOLO [1,5-C]QUINAZOLINE DERIVATIVES AND RELATED COMPOUNDS

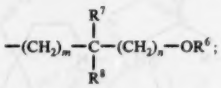
B. Richard Vogt, Yardley, Pa., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jul. 2, 1976, Ser. No. 702,364
Int. Cl.[2] A61K *31/305;* C07D *487/04*
U.S. Cl. 424—251 11 Claims

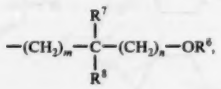
1. A compound of the structure



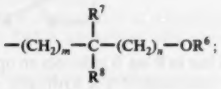
wherein R^1 and R^2 are the same or different, and R^1 is selected from the group consisting of hydrogen, lower alkyl, phenyl, phenyl having an R^4 substituent, or



R^2 is selected from the group consisting of

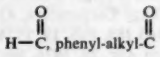


hydrogen, lower alkyl, phenyl or phenyl having an R^2 substitutent, with the proviso that at least one of R^1 and R^2 is



R^6 is selected from the group consisting of

having 1 to 8 carbons in the alkyl group,



having 1 to 8 carbons in the alkyl group or

wherein phenyl includes unsubstituted phenyl, mono-, or di-lower-alkylphenyl, or halophenyl;

R^3 is selected from the group consisting of hydrogen, lower alkyl, benzyl, phenyl, or phenyl having an R^4 sustituent;

R^4 and R^5 are the same or different and are selected from the group consisting of hydrogen, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, lower alkanoyloxy of 1 to 4 carbons, nitro, benzyloxy, benzyloxy having a lower alkoxy, halogen, hydroxy, or trifluoromethyl substituent;

R^7 and R^8 may be the same or different and are selected from the group consisting of hydrogen, alkyl of 1 to 3 carbons, phenyl, phenyl having a lower alkoxy substituent, benzyl, or benzyl having a lower alkoxy substituent, or R^7 and R^8 taken together is a single cycloalkyl ring of 3 to 7 carbons;

$(CH_2)_m$ and $(CH_2)_n$ represent straight chain alkylene radicals or mono- or di-alkyl substituted alkylene radicals wherein the alkyl group has 1 to 8 carbons, m and n are integers which represent the number of carbon atoms in the longest normal chains and may be the same or different and are 0 to 10, with the proviso that $m + n \leq 10$,

and physiologically acceptable salts thereof.

10. A pharmaceutical composition for use in treating allergic conditions comprising a compound as defined in claim 1 and a pharmaceutically acceptable carrier therefor.

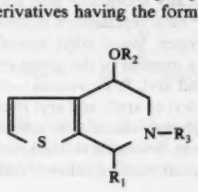
4,076,819

THIENO-PYRIDINE DERIVATIVES AND THERAPEUTIC COMPOSITION CONTAINING SAME

Jean-Pierre Maffrand, Toulouse, France, assignor to Parcor, Paris, France

Filed Apr. 14, 1976, Ser. No. 676,796
Claims priority, application France, May 30, 1975, 75 17007
Int. Cl.[2] A61K *31/44;* C07D *407/04*
U.S. Cl. 424—256 4 Claims

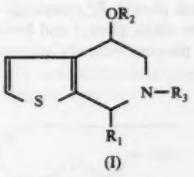
1. A compound selected from the group consisting of the thieno-pyridine derivatives having the formulae



(I)

in which R_1 is selected from the group consisting of hydrogen and the alkyl groups having 1–6 carbon atoms; R_2 is selected from the group consisting of hydrogen, acetyl and lower alkyl-carbamoyl; and R_3 is selected from methyl, nitrobenzyl, chlorobenzyl, methoxybenzyl, chlorobenzoyl, trimethoxybenzoyl, pyrrolidinoacetyl, p.toluene-sulfonyl, phenylcarbamoyl, phenylthiocarbamoyl, 3-oxo-butyl, lower alkyl-carbamoyloxy, phenethyl, dichloroacetyl, 2-chlorophenoxy-2-methyl-propionyl and chlorophenyl-carbamoyl; and the pharmaceutically acceptable acid addition salts thereof.

2. Therapeutic composition having an anti-inflammatory activity and an inhibitor activity on blood plate aggregation, comprising an effective amount of a compound selected from the group consisting of the thieno-pyridine derivatives having the formulae:



(I)

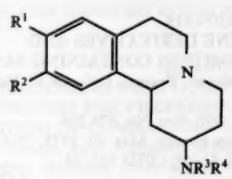
in which R_1 is selected from the group consisting of hydrogen and the alkyl groups having 1–6 carbon atoms; R_2 is selected from the group consisting of hydrogen, acetyl and lower alkyl-carbamoyl; and R_3 is selected from the group consisting of oxybenzyl, chlorobenzoyl, trimethoxybenzoyl, pyrrolidinoacetyl, p.toluene-sulfonyl, phenylcarbamoyl, phenylthiocarbamoyl, 3-oxo-butyl, lower alkyl-carbamoyloxy, phenethyl, dichloroacetyl, 2-chlorophenoxy-2-methyl-propionyl and chlorophenyl-carbamoyl; and the pharmaceutically acceptable acid addition salts thereof, together with an inert pharmaceutical vehicle.

4,076,820
BENZOQUINOLIZINES AND HYPOTENSIVE COMPOSITIONS CONTAINING THEM

John Leheup Archibald, Windsor, and John Lambert Jackson, Royston, both of England, assignors to John Wyeth & Brother, Limited, Maidenhead, England

Filed May 13, 1976, Ser. No. 685,834
Claims priority, application United Kingdom, May 22, 1975, 22030/75
Int. Cl.[2] A61K *31/47;* C07D *455/06*
U.S. Cl. 424—258 6 Claims

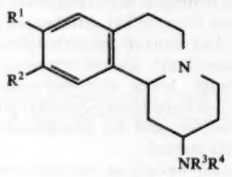
1. A compound selected from the group consisting of a benzoquinolizine of formula



(I)

and a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^2 each represents a member from the group consisting of hydrogen, lower alkyl, lower alkoxy and halogen, R^3 represents a member of the group consisting of hydrogen, lower alkyl and aryl, R^4 represents $—SO_2R^5$ (wherein R^5 represents lower alkyl or aryl), and aryl represents phenyl and mono-substituted phenyl, wherein the substituents are selected from halogen, alkoxy, lower alkyl, methylenedioxy, ethylenedioxy, amino, lower alkylamino, dilower alkylamino and trifluoromethyl.

6. A hypotensive composition comprising a hypotensively effective amount of a compound selected from the group consisting of a benzoquinolizine of formula



(I)

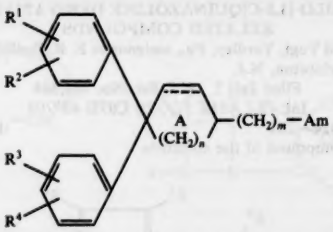
and a pharmaceutically acceptable acid addition salt thereof, wherein R^1 and R^2 each represents a member from the group consisting of hydrogen, lower alkyl, lower alkoxy and halogen, R^3 represents a member of the group consisting of hydrogen, lower alkyl and phenyl, R^4 represents $—SO_2R^5$ (wherein R^5 represents lower alkyl, phenyl and lower alkylphenyl), in association with a pharmaceutically acceptable carrier.

4,076,821
4,4-DIPHENYLCYCLOALKYLPIPERIDINES AND PSYCHOTROPIC COMPOSITIONS THEREOF

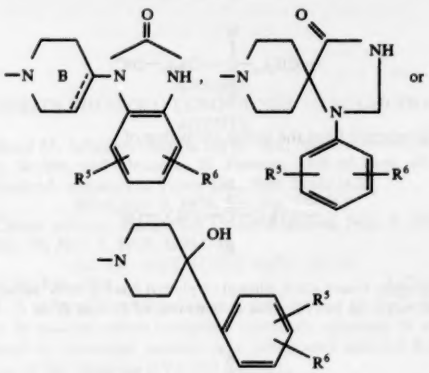
Yoshinao Tsuda, Fukuoka; Masafumi Arita, Nakatsu; Toshio Hamasaki, Nakatsu; Tatsumi Tsumagari, Nakatsu, and Takenori Kenjo, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Feb. 27, 1976, Ser. No. 662,197
Int. Cl.[2] C07D *401/04*
U.S. Cl. 424—263 52 Claims

1. A compound of the formula:



wherein:
the dotted line in Ring A indicates an optional bond;
R^1, R^2, R^3 and R^4 are independently a hydrogen atom, a halogen atom, a trifluoromethyl group or a lower alkyl group;
n is 1 or 2;
m is 0 or 1;
Am is a piperidino group of the formula:



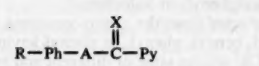
where the dotted line in Ring B indicates an optional bond; and R^5 and R^6 are independently a hydrogen atom, a halogen atom, a trifluoromethyl group or a lower alkyl group; and a pharmaceutically acceptable salt thereof.

4,076,822
CERTAIN PYRIDYL METHANONES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Georges Haas, and Alberto Rossi, both of Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 443,289, Feb. 19, 1974, Pat. No. 3,980,657.
This application Apr. 28, 1976, Ser. No. 680,946
Claims priority, application Switzerland, Feb. 19, 1973, 2381/73; Oct. 23, 1973, 14936/73
Int. Cl.[2] C07D *213/50;* A61K *31/44*
U.S. Cl. 424—263 9 Claims

1. An anti-inflammatory pharmaceutical composition comprising an anti-inflammatory effective amount of a compound of the formula



wherein R denotes cycloalkenyl or cycloalkyl radical with 5 to 10 ring members which is unsubstituted or substituted by C_1–C_4-alkyl, C_2–C_4-alkenyl, C_1–C_4-alkoxy, hydroxyl or oxo, or a 2- or 3-bicyclo[4,4,0]-decyl or -dec-2-enyl, 2-bicyclo[2,2,2]-oxtyl or -oct-2-enyl, 2-bornyl, 2-norbornyl, 2-bornenyl, 2-norbornenyl radical which is unsubstituted or substituted by

C_1–C_4-alkyl or C_1–C_4-alkoxy or 1- or 2- adamantyl, Ph denotes p-phenylene unsubstituted or substituted by nitro, trifluoromethyl, C_1–C_4-alkyl, C_1–C_4-alkoxy, chlorine, fluorine or bromine, A denotes 1,3- or 1,2- propylene, propylidene, isopropylidene, ethylene, methylene, ethylidene, X denotes an oxo group, two C_1–C_4-alkoxy or C_1–C_4-alkylthio radicals or a C_2–C_4-alkylenedioxy or C_2–C_4-alkylene dithio group, and Py denotes a pyridyl radical which is unsubstituted or C-substituted by C_1–C_4-alkoxy or a therapeutically acceptable acid addition salt thereof.

4,076,823

TRIAZOLO-2,4-BENZODIAZEPINES

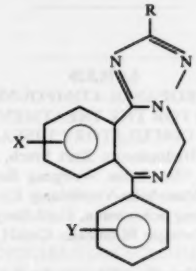
Peter C. Wade, Pennington, N.J.; B. Richard Vogt, Yardley, Pa., and Thomas P. Kissick, Princeton, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 18, 1977, Ser. No. 825,744

Int. Cl.[2] A61K *31/55*; C07D *487/04*

U.S. Cl. 424—269 **10 Claims**

1. A compound of the structure



wherein X is hydrogen, halogen, lower alkyl, lower alkoxy, trifluoromethyl or nitro; Y is hydrogen, halogen, lower alkyl, lower alkoxy, trifluoromethyl or nitro; and R is hydrogen, lower alkyl or trifluoromethyl.

8. A pharmaceutical composition comprising a compound as defined in claim **1** and a physiologically acceptable carrier therefor.

9. A method for treating an inflammatory condition in mammals which comprises administering a therapeutic amount of a composition as defined in claim **8**.

10. A method for treating anxiety in mammals, which comprises administering a therapeutic amount of a composition as defined in claim **8**.

4,076,824

ANTHELMINTIC OXADIAZOLINONE DERIVATIVES

Roger Boesch, Vitry-sur-Seine, France, assignor to Rhone-Poulenc Industries, Paris, France

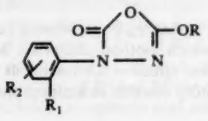
Filed Feb. 2, 1976, Ser. No. 654,587

Claims priority, application France, Feb. 3, 1975, 75 03281; Feb. 3, 1975, 75 03282

Int. Cl.[2] A61K *31/42*

U.S. Cl. 424—272 **14 Claims**

1. A method for the treatment of helminth infections in domestic animals and humans which comprises administering orally to a dometic animal or a human being infected with helminths an anthelmintically effective amount of an oxadiazolinone derivative of the formula:



wherein R represents alkyl of 1 through 4 carbon atoms, R_1 represents halogen, alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms or alkylthio of 1 through 4 carbon atoms, and R_2 represents hydrogen, halogen, alkyl of 1 through 4 carbon atoms, alkoxy of 1 through 4 carbon atoms or alkylthio of 1 through 4 carbon atoms.

4,076,825

METHOD OF TREATING HELMINTHIASIS BY PARENTERAL OR TOPICAL ADMINISTRATION OF SULFOXIDE DERIVATIVES OF BENZIMIDAZOLES

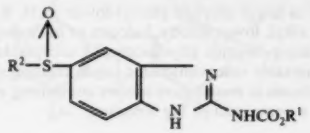
Rudiger D. Haugwitz, Titusville, and Larry R. Cruthers, Flemington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jun. 22, 1977, Ser. No. 809,150

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R **13 Claims**

1. A method of treating or preventing helminthiasis, which comprises parenterally administering to a mammalian host an effective amount of a compound of the structure



wherein R^1 is lower alkyl or phenyl-lower alkyl, R^2 is lower alkyl containing 1 to 7 carbons, dispersed in a non-toxic non-pyrogenic physiologically acceptable carrier.

4,076,826

3-(β-HYDROXYETHYLIDENE)-6-(α-HYDROXYETHYL)-7-OXO-4-OXAAZABICYCLO[3.2.0]HEPTENE-2-CARBOXYLIC ACID AND DERIVATIVES THEREOF

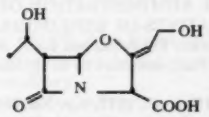
Burton A. Christensen, Scotch Plains; Robert B. Morin, Warren, and Edward Walton, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 676,263, Apr. 12, 1976, abandoned. This application Aug. 6, 1976, Ser. No. 712,453

Int. Cl.[2] A61K *31/42*; C07D *498/04*

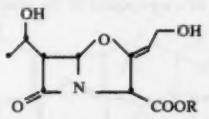
U.S. Cl. 424—272 **5 Claims**

1. A compound having the structure:



and the pharmaceutically acceptable salts thereof.

2. A compound having the structure:



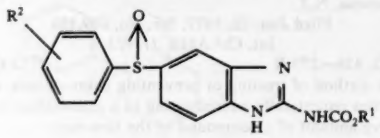
wherein R is selected from the group consisting of alkyl having 1 to 6 carbon atoms; pivalolyloxymethyl, halo- and perhaloalkyl having 1 to 6 carbon atoms wherein the halogen is chloro, fluoro or bromo; alkenyl having from 2 to 6 carbon atoms; benzyl, benzhydryl, p-t-butylbenzyl, p-bromobenzyl, phthalidyl, 5-indanylmethyl, phenyl, 5-indanyl, acetylthiomethyl, acetylthioethyl, pivaloythiomethyl, and alkylthioalkyl, having 2 to 6 carbon atoms.

4,076,827
METHOD OF TREATING HELMINTHIASIS BY PARENTERAL ADMINISTRATION OF SULFOXIDE DERIVATIVES OF BENZIMIDAZOLES

Rudiger D. Haugwitz, Titusville, and Larry R. Cruthers, Flemington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

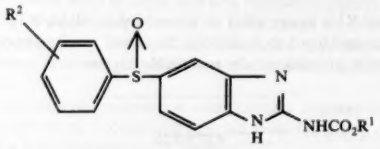
Filed Apr. 28, 1977, Ser. No. 791,828
Int. Cl.² A61K *31/415*
U.S. Cl. 424—273 R **8 Claims**

1. A method of treating or preventing helminthiasis, which comprises parenterally administering to a mammalian host an effective amount of a compound of the structure



wherein R^1 is lower alkyl or phenyl-lower alkyl, R^2 is hydrogen, lower alkyl, lower alkoxy, halogen or nitro dispersed in a non-toxic non-pyrogenic physiologically acceptable carrier.

7. An injectable composition for use in treating or preventing helminthiasis in mammalian species comprising an effective amount of a compound of the structure



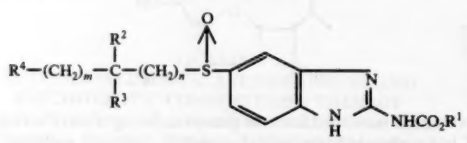
wherein R^1 is lower alkyl or phenyl-lower alkyl, R^2 is hydrogen, lower alkyl, lower alkoxy, halogen or nitro, and a non-toxic non-pyrogenic physiologically acceptable carrier therefor selected from the group consisting of sterile water for injection, benzyl benzoate, 1,3-butylene glycol, ethyl oleate, glyceryl triacetate, mixtures thereof and a mixture of benzyl benzoate and sesame oil.

4,076,828
METHOD OF TREATING HELMINTHIASIS BY PARENTERAL ADMINISTRATION OF SULFOXIDE DERIVATIVES OF BENZIMIDAZOLES

Rudiger D. Haugwitz, Titusville, and Larry R. Cruthers, Flemington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

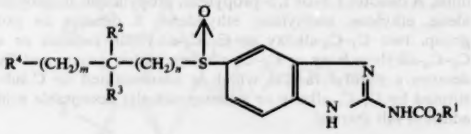
Filed Feb. 17, 1977, Ser. No. 769,632
Int. Cl.² A61K *31/415*
U.S. Cl. 424—273 R **16 Claims**

1. A method of treating or preventing helminthiasis, which comprises parenterally administering to a mammalian host an effective amount of a compound of the structure



wherein R^1 is lower alkyl, phenyl-lower alkyl, R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen or lower alkyl, and R^4 is cycloalkyl, m is 0 to 3, n is 0 to 3 and $m + n$ is $\leqq 5$, dispersed in a non-toxic nonpyrogenic physiologically acceptable carrier.

11. An injectable composition for use in treating or preventing helminthiasis in mammalian species comprising an effective amount of a compound of the structure



wherein R^1 is lower alkyl, phenyl-lower alkyl, R^2 and R^3 are the same or different and are selected from the group consisting of hydrogen or lower alkyl, and R^4 is cycloalkyl, m is 0 to 3, n is 0 to 3 and $m + n$ is $\leqq 5$, and a non-toxic non-pyrogenic physiologically acceptable carrier therefor selected from the group consisting of benzyl benzoate, 1,3-butylene glycol, ethyl oleate, glyceryl triacetate, mixtures thereof and a mixture of benzyl benzoate and sesame oil.

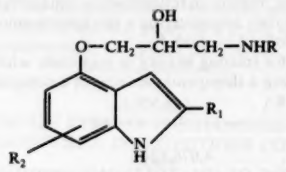
4,076,829
AMINOPROPANOL COMPOUNDS AND COMPOSITIONS FOR THE TREATMENT OF CARDIAC AND CIRCULATORY DISEASES

Wolfgang Kampe, Heddesheim; Kurt Stach, Mannheim-Waldhof; Max Thiel, Mannheim; Wolfgang Bartsch, Viernheim; Karl Dietmann, Mannheim-Vogelstang; Egon Roesch, Mannheim, and Wolfgang Schaumann, Heidelberg, all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

Filed Oct. 28, 1975, Ser. No. 626,512
Claims priority, application Germany, Nov. 16, 1974, 2454406; Jun. 27, 1975, 2528771; Feb. 11, 1975, 2505681; Feb. 26, 1975, 2508251
Int. Cl.² A61K *31/40*; C07D *209/14*
U.S. Cl. 424—274 **19 Claims**

1. Aminopropanol compound of the formula

(I)



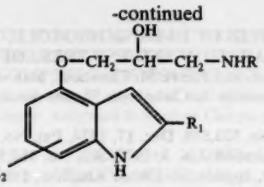
wherein
R is lower alkyl or cycloalkyl
R_1 is hydrogen or lower alkyl, hydroxyalkyl, alkoxyalkyl, and
R_2 is in the 6- position and is selected from lower alkyl, hydroxyalkyl, and alkoxyalkyl
and the pharmacologically acceptable salts thereof.

14. Therapeutic composition for the treatment or prophylaxis of cardiac and circulatory diseases which composition comprises a pharmaceutically acceptable carrier and in amounts effective for treatment or prophylaxis of cardiac or circulatory diseases an aminopropanol compound as claimed in claim 1.

15. Method of combatting or preventing cardiac and circulatory infirmities which method comprises administering to a mammal in amounts effective for treatment or prophylaxis of cardiac or circulatory diseases an aminopropanol compound of the formula

(I)

-continued



wherein

R is lower alkyl or cycloalkyl

R_1 is hydrogen or lower alkyl, hydroxyalkyl, alkoxyalkyl, and

R_2 is in the 6- position and is selected from lower alkyl, hydroxyalkyl, and alkoxyalkyl

and the pharmacologically acceptable salts thereof.

4,076,830

ALKYLMETHANODIBENZOCYCLOHEPTAPYRROLES

Engelbert Ciganek, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

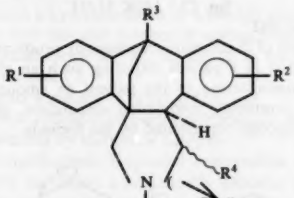
Continuation-in-part of Ser. No. 674,667, Apr. 7, 1976, abandoned, which is a continuation-in-part of Ser. No. 663,430, Mar. 3, 1976, which is a continuation-in-part of Ser. No. 545,001, Jan. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 448,686, Mar. 6, 1974, abandoned. This application Jun. 29, 1976, Ser. No. 700,964

Int. Cl.[2] C07D *209/70;* A61K *31/40*

U.S. Cl. 424—274 27 Claims

1. A compound

(A) of the formula



wherein

n is zero or 1;

R is hydrogen, alkyl of 1-4 carbons or cycloalkylalkyl of 5-10 carbon atoms, with the proviso that when R is hydrogen *n* is zero;

R^1 and R^2 individually are hydrogen, alkyl or alkoxy each of, 1-4 carbons, nitro, amino, hydroxyl or cyano, with the proviso that at least one of R^1 and R^2 is hydrogen;

R^3 and R^4 individually are H, methyl or ethyl, with the proviso that only one of R^3 and R^4 can be H; and

(B) a pharmaceutically acceptable acid addition salt of (A) where *n* is zero.

4,076,831

PYRANO[3,4-B]-INDOLE DERIVATIVES, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE

Christopher A. Demerson, Montreal; Leslie G. Humber; Thomas A. Dobson, both of Dollard des Ormeaux, and Ivo L. Jirkovsky, Montreal, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

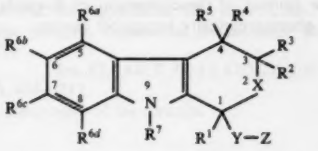
Division of Ser. No. 555,506, Mar. 5, 1975, Pat. No. 4,012,417, which is a continuation-in-part of Ser. No. 513,693, Oct. 10, 1974, Pat. No. 3,974,179, which is a continuation-in-part of Ser. No. 311,023, Nov. 30, 1972, abandoned, which is a continuation-in-part of Ser. No. 289,714, Sep. 15, 1972, Pat. No. 3,939,178, which is a continuation-in-part of Ser. No. 148,895, Jun. 1, 1971, Pat. No. 3,843,681. This application Dec. 13, 1976, Ser. No. 749,931

Claims priority, application South Africa, May 16, 1972, 72/3344

Int. Cl.[2] A61K *31/40;* C07D *491/04, 495/04*

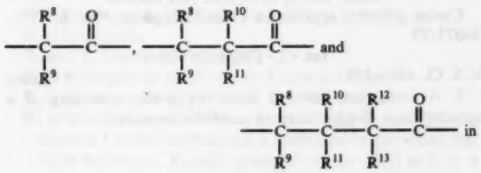
U.S. Cl. 424—274 17 Claims

1. A compound of the formula Ia



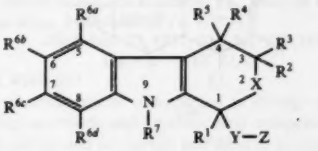
Ia

in which R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, lower cycloalkyl, phenyl, benzyl and 2-thienyl, R^2, R^3, R^4 and R^5 are the same or different and are each selected from the group consisting of hydrogen and lower alkyl, R^{6a}, R^{6b}, R^{6c}, and R^{6d} are the same or different and selected from the group consisting of lower cycloalkyl and phenyl R^7 is selected from the group consisting of hydrogen, lower alkyl and lower alkenyl, X is selected from the group consisting of oxy and thio, Y is selected from the group consisting of carbonyl,



which each of R^8, R^9, R^{10}, R^{11}, R^{12} and R^{13} is hydrogen or lower alkyl, and Z is selected from the group consisting of hydroxy and lower alkoxy.

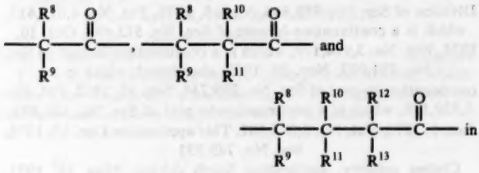
6. A method of treating inflammation in a warm-blooded animal, comprising: administering perorally to said animal an antiinflammatorily effective amount of the compound of the following formula Ib



Ib

in which R^1 is selected from the group consisting of lower alkyl, lower alkenyl, lower alkynyl, lower cycloalkyl, phenyl, benzyl and 2-thienyl, R^2, R^3, R^4 and R^5 are the same or different and are each selected from the group consisting of hydrogen and lower alkyl, R^{6a}, R^{6b}, R^{6c}, and R^{6d} are the same or different and selected from the group consisting of hydrogen, lower

alkyl, lower cycloalkyl, hydroxy, lower alkoxy, benzyloxy, lower alkanoyloxy, phenyl, nitro, halo, mercapto, lower alkylthio, trifluoromethyl, amino and sulfamoyl, R^7 is selected from the group consisting of hydrogen, lower alkyl and lower alkenyl, X is selected from the group consisting of oxy and thio, Y is selected from the group consisting of carbonyl,



and

in

which each of R^8, R^9, R^{10}, R^{11}, R^{12} and R^{13} is hydrogen or lower alkyl, and Z is selected from the group consisting of hydroxy and lower alkoxy.

9. A pharmaceutical composition, comprising: an analgesically effective amount of the compound of Formula 1b of claim 6 and a pharmaceutically acceptable carrier.

4,076,832

CYCLODIENE INSECTICIDES

Gerald Thomas Brooks, Burgess Hill, England, assignor to National Research Development Corporation, England

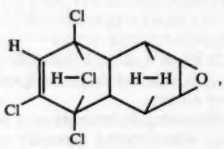
Filed Nov. 5, 1976, Ser. No. 739,323

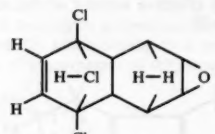
Claims priority, application United Kingdom, Nov. 6, 1975, 46077/75

Int. Cl.² C07D *303/08*

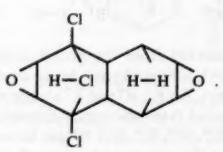
U.S. Cl. 424—278 **6 Claims**

1. A compound selected from the group consisting of a syn-dechloro dieldrin derivative of the formula:





and



4,076,833

DERIVATIVES OF 1,3-BENZODIOXOLE, THE PREPARATION AND USE THEREOF

Pierre M. Vanhoof, and Pierre M. Clarebout, both of Brussels, Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

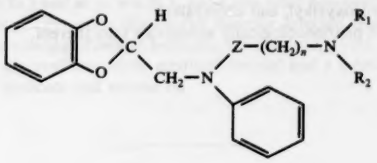
Division of Ser. No. 533,558, Dec. 17, 1974, Pat. No. 4,016,284. This application Jan. 3, 1977, Ser. No. 756,529

Claims priority, application United Kingdom, Dec. 17, 1973, 58292/73

Int. Cl.² A61K *31/36*

U.S. Cl. 424—282 **3 Claims**

1. Derivatives of 1,3-benzodioxole of the following general formula



in which Z represents

R_1 and R_2 which may be identical or different represent each a lower alkyl group containing 1 to 4 carbon atoms and R_1 may also represent hydrogen, *n* is equal to 2 or 3, and the pharmaceutically acceptable acid addition salts thereof.

3. A pharmaceutical composition for the treatment of heart arrhythmia which comprises as the active ingredient an amount effective to treat arrhythmia of a derivative according to claim 1 together with a pharmaceutical excipient.

4,076,834

THERAPEUTIC AGENTS FOR IMPROVING CARDIOVASCULAR FUNCTION

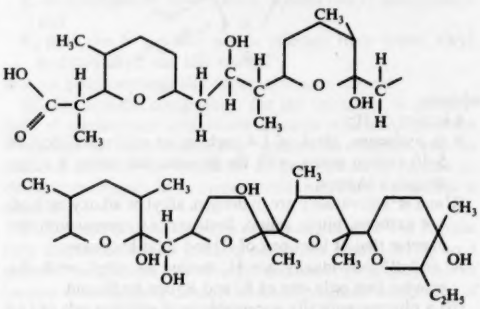
John Westley, Mountain Lakes, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 489,977, Jul. 19, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,226

Int. Cl.² A61K *31/35*

U.S. Cl. 424—283 **1 Claim**

1. A method of therapeutic treatment by producing myocardial stimulation in a patient requiring such an effect which comprises administering to the patient an amount which is effective in producing myocardial stimulation, of antibiotic X-206, a compound represented by the formula



or pharmaceutically acceptable salts thereof.

4,076,835

ESTER OF CHRYSANTHEMIC ACID, PROCESS FOR THE PREPARATION THEREOF AND INSECTICIDAL COMPOSITIONS CONTAINING THEM

Keisuke Murayama; Motoji Asai, and Hideakira Tsuji, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Division of Ser. No. 292,262, Sep. 25, 1972, abandoned, which is a continuation of Ser. No. 42,450, Jun. 1, 1970, abandoned. This application Dec. 12, 1975, Ser. No. 640,229

Claims priority, application Japan, Jun. 2, 1969, 44-43143; Aug. 16, 1969, 44-64809

Int. Cl.[2] A01N *9/28*

U.S. Cl. 424—285 2 Claims

1. An insecticidal composition comprising an insecticidally effective amount of 2,3-dihydro-7-methyl-3-benzofuranyl chrysanthemate and a compatible carrier.

4,076,836

ACYLATED PHENYLAMINE THIOPROPIONATES USEFUL IN COMBATTING PLANT FUNGI

Adolf Hubele, Magden; Walter Kunz, Oberwil, both of Switzerland, and Wolfgang Eckhardt, Lorrach, Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

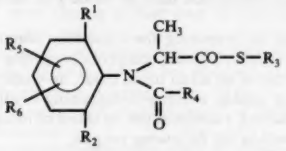
Filed Sep. 24, 1976, Ser. No. 726,348

Claims priority, application Switzerland, Sep. 30, 1975, 12648/75

Int. Cl.[2] A61K *31/34*

U.S. Cl. 424—285 11 Claims

1. A compound of the formula I



(I)

wherein

R_1 represents a C_1–C_4-alkyl or C_1–C_4-alkoxy group or a halogen atom,

R_2 represents a C_1–C_3-alkyl or C_1–C_4-alkoxy group or a halogen atom,

R_5 represents a hydrogen atom, a C_1–C_3-group or a halogen atom,

R_6 represents a hydrogen atom or a methyl group, with the proviso that the total number of carbon atoms contained by the substituents R_1, R_2, R_5 and R_6 in the phenyl ring does not exceed 8,

R_3 represents a methyl or ethyl group, and

R_4 represents 2-furanyl or 2-tetrahydrofuranyl unsubstituted or substituted by methyl or halogen.

9. A phytopathogenic fungicidal composition which contains as active ingredient a fungicidally effective amount of a compound as claimed in claim 1, together with a suitable inert carrier therefor.

4,076,837

PESTICIDAL FORMAMIDINE COMPOUNDS

Manfred Boger, Weil am Rhine, Germany, and Jozef Drabek, Allschwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

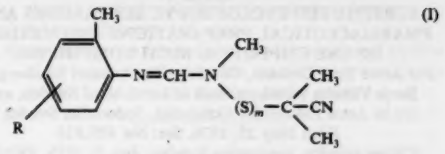
Filed Nov. 11, 1976, Ser. No. 740,899

Claims priority, application Switzerland, Nov. 20, 1975, 15032/75; Oct. 21, 1976, 13308/76

Int. Cl.[2] A01N *9/20;* C07C *121/52*

U.S. Cl. 424—304 9 Claims

1. A compound of the formula I



(I)

wherein R represents chlorine or methyl in the 4- or 6-position and *m* represents 1 or 2.

6. An insecticidal and acaricidal composition which comprises an insecticidally and acaricidally effective amount of a compound of claim 1, together with a suitable carrier therefor.

4,076,838

BENZOCYCLOHEPTENE-2-ACETIC ACIDS

Trevor Glyn Payne, Arlesheim, Australia, assignor to Sandoz Ltd., Basel, Switzerland

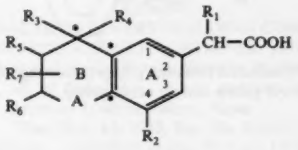
Continuation-in-part of Ser. No. 625,815, Oct. 28, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,213

Claims priority, application Switzerland, Oct. 29, 1974, 14472/74

Int. Cl.[2] A61K *31/19;* C07C *63/00*

U.S. Cl. 424—317 18 Claims

1. A compound of the formula



where

R_1 is hydrogen or alkyl of 1 or 2 carbon atoms,

R_2 is hydrogen,

R_3 and R_4 together are oxygen,

R_5 is hydrogen or alkyl of 1 to 4 carbon atoms,

R_6 is hydrogen or alkyl of 1 to 4 carbon atoms;

R_7 is attached to any carbon atom of ring B except those marked * in the formula and is hydrogen or, provided that R_6 is hydrogen, R_7 may alternatively be alkyl of 1 to 4 carbon atoms; or

R_5 and R_7 are attached to the same carbon atoms and form an alkylene chain of 3 to 6 carbon atoms, and

A is $-(CH_2)_2-$.

4,076,839

URICOSURIC COMPOSITION AND METHOD OF PRODUCING URICOSURIA AND HYPOURICEMIA

Alfred Roland Maass, Swarthmore, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Jun. 27, 1977, Ser. No. 810,244

Int. Cl.[2] A61K *31/19*

U.S. Cl. 424—317 9 Claims

1. A pharmaceutical composition in dosage unit form for producing uricosuria and hypouricemia comprising a pharmaceutical carrier and an amount sufficient to produce uricosuria and hypouricemia of the compound 2,3-dichloro-4-carboxyphenoxyacetic acid or an alkali metal salt of said acid.

4. A method of producing uricosuria and hypouricemia which comprises administering internally to a subject in need thereof a nontoxic amount sufficient to produce uricosuria and hypouricemia of the compound 2,3-dichloro-4-carboxyphenoxyacetic acid or an alkali metal salt of said acid.

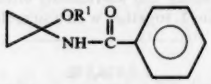
4,076,840

SUBSTITUTED CYCLOPROPYL BENZAMIDES AND PHARMACEUTICAL PREPARATIONS AND METHODS OF USE EMPLOYING SUCH COMPOUNDS

Per Arvid Emil Carlsson, Goteborg; Per Lennart Lindberg, and Borje Vilhelm Wickberg, both of Lund, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

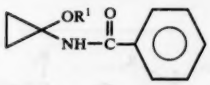
Filed May 25, 1976, Ser. No. 689,824
Claims priority, application Sweden, Jun. 9, 1975, 7506546
Int. Cl.[2] C07C *103/78;* **A61K** *31/165*
U.S. Cl. 424—324 **12 Claims**

1. A compound of the formula



wherein R^1 is selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group.

9. A method for the treatment of alcoholism comprising administering to a host suffering from the symptoms of alcoholism a therapeutically effective amount of a compound of the formula



wherein R^1 is selected from the group consisting of a hydrogen atom, a methyl group and an ethyl group.

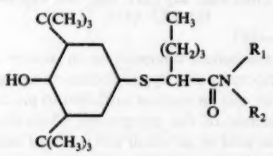
4,076,841

HYPOLIPIDEMIC 2-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL)THIO CARBOXAMIDES

Eugene R. Wagner, Midland, and Larry G. Mueller, Ypsilanti, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

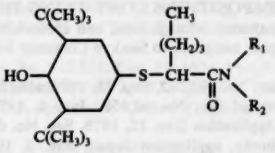
Division of Ser. No. 658,971, Feb. 18, 1976, Pat. No. 4,029,812. This application Mar. 4, 1977, Ser. No. 774,561
Int. Cl.[2] A61K *31/15, 31/165;* **C07C** *103/75, 103/78*
U.S. Cl. 424—324 **10 Claims**

1. A compound of the formula:



wherein R_1 and R_2 independently represent hydrogen, lower alkyl, or lower hydroxyalkyl.

4. A method for lowering elevated serum lipids in a mammal which comprises administering internally to the mammal a hypolipidemically effective amount of a compound of the formula:



wherein R_1 and R_2 independently represent hydrogen, lower alkyl, or lower hydroxyalkyl.

4,076,842

CRYSTALLINE ZEOLITE ZSM-23 AND SYNTHESIS THEREOF

Charles J. Plank, Woodbury; Edward J. Rosinski, Pedricktown, both of N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 585,632, Jun. 10, 1975, abandoned. This application Nov. 8, 1976, Ser. No. 739,414
Int. Cl.[2] C01B *33/28*
U.S. Cl. 423—328 **21 Claims**

1. A synthetic crystalline aluminosilicate zeolite having a composition in the anhydrous state, expressed in terms of mole ratios of oxides, as follows:

$$(0.58\text{–}3.4)M_2O : Al_2O_3 : (40\text{–}250)\ SiO_2$$

wherein M is at least one cation having a valence *n*, said zeolite having the X-ray diffraction lines of Table I of the specification.

10. A method for preparing the crystalline aluminosilicate zeolite defined in claim **1** which comprises preparing a mixture containing sources of an alkali metal oxide, an oxide of aluminum, an oxide of silicon, a nitrogen-containing organic cation and water and having a composition, in terms of mole ratios of oxides, falling within the following ranges:

$R+/(R+ + M+)$: 0.85–0.95
$OH-/SiO_2$: 0.01–0.049
$H_2O/OH-$: 200–600
SiO_2/Al_2O_3 : 55–70

wherein R is a nitrogen-containing cation derived from pyrrolidine and M is an alkali metal ion, maintaining the mixture at a temperature of above 280° F until the crystals of said aluminosilicate are formed.

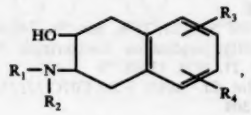
4,076,843

5,6,7,8-TETRAHYDRONAPHTHALENE HYPOTENSIVE AGENTS

Frederic Peter Hauck, Somerville; Christopher M. Cimarusti, Hamilton, both of N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 268,314, Jul. 3, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 428,466
Int. Cl.[2] A61K *31/135*
U.S. Cl. 424—330 **20 Claims**

1. A method of lowering the blood pressure of a mammalian host in need thereof which comprises orally administering to said mammalian host an effective dose of a compound having the structure



or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen or alkyl; R_2 is alkyl; and R_3 and R_4 are each hydrogen, hydroxyl, alkoxy, or arylalkoxy, at least one of R_3 and R_4 being other than hydroxyl; wherein the terms alkyl and alkoxy refer to groups having 1 to 8 carbon atoms and wherein the term arylalkoxy refers to an alkoxy group substituted with phenyl or mono- or di-substituted phenyl wherein the substituents are halogen, alkyl or alkoxy.

4,076,844

TWO STAGE PROCESS FOR THE PRODUCTION OF VINEGAR WITH HIGH ACETIC ACID CONCENTRATION

Heinrich Ebner, Bonn-Ippendorf, and Anton Enenkel, Bonn-Roettgen, both of Germany, assignors to Firma Heinrich Frings, Bonn, Germany

Filed Dec. 22, 1975, Ser. No. 643,297

Int. Cl.[2] C12J *1/04*

U.S. Cl. 426—17 **9 Claims**

1. A two-stage submerged fermentation process for the production of vinegar with an acetic acid concentration of more than 15%, wherein

1. the first fermentation stage is characterized by

A. a total concentration, defined as the sum of the alcohol concentration expressed in percent volume by volume and the acetic acid concentration expressed in percent weight by volume, which

i. is at substantially a starting level of between 12 and 15% thereof during an initial part of said first fermentation stage,

ii. increases from said starting level thereof to above 15% during a middle part of said first fermentation stage, and

iii. is continuously above 15% and substantially constant during a final part of said first fermentation stage, and

B. an acetic acid concentration which increases from the starting level thereof but does not exceed 15% during the entire first fermentation stage,

and insures both multiplication of bacteria and acidification, and

2. the second fermentation stage is characterized by

A. said total concentration which is above 15% and substantially constant and

B. an acetic acid concentration which is above 15% and permits acidification to continue while multiplication of bacteria ceases;

said process comprising:

a. starting a submerged vinegar fermentation and thereby starting said initial part of said first fermentation stage by aerating, at substantially constant temperature between 27° and 34° C, a mixture of materials, constituting the fermenting liquid, which includes acetic acid, alcohol, bacteria (Acetobacter), and nutrients for the bacteria and which is characterized by a starting level of the acetic acid concentration, expressed in percent weight by volume, between 7 and 10% and by the said starting level of the total concentration between 12 and 15%;

b. adding to the fermenting liquid, for effecting said middle part of said first fermentation stage, a 30–100% solution of ethyl alcohol in a quantity and at a rate sufficient to effect the increase of the total concentration to above 15%;

c. dividing the fermenting liquid into a transferred and a remaining portion during said first fermentation stage;

d. bringing the acetic acid concentration of said remaining portion of the fermenting liquid back to the starting level thereof, and subjecting said remaining portion further to at least the initial part of said first fermentation stage at a total concentration of substantially said starting level thereof;

e. subjecting said transferred portion of the fermenting liquid to at least said second fermentation stage by aerating it under substantially constant temperature of between 27° and 34° C without further addition of alcohol until the alcohol concentration decreases to substantially zero; and

f. terminating the fermentation of said transferred portion of the fermenting liquid when the alcohol concentration therein has decreased to substantially zero.

4,076,845

PROCESS FOR USING A POWDERED GLUTEN COMPOSITION IN BAKING

Harold P. Johannson, London, Canada, assignor to Industrial Grain Products, Limited, Montreal, Canada

Continuation-in-part of Ser. No. 549,274, Feb. 12, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 679,077

Int. Cl.[2] A21D *2/26;* **A23J** *3/00*

U.S. Cl. 426—19 **5 Claims**

1. A short-time baking process which comprises mixing the ingredients of a dough formulation, subjecting the dough formulation to mechanical working until the dough formulation is developed or to chemical dough developing, proofing the dough and baking the dough, the improvement comprising incorporating into said dough formulation up to and including 20 percent by weight, based on dry flour, a dry powder composition comprising vital gluten modified by reaction with up to 5 percent by weight, based on dry gluten, of a non-toxic chelating agent.

4,076,846

PROTEIN-STARCH BINARY MOLDING COMPOSITION AND SHAPED ARTICLES OBTAINED THEREFOR

Ryuzo Nakatsuka; Setsuo Suzuki; Shinichi Tanimoto, and Eiji Funatsu, all of Yokohama, Japan, assignors to Sumitomo Bakelite Company Limited, Tokyo, Japan

Filed Nov. 12, 1975, Ser. No. 631,405

Claims priority, application Japan, Nov. 22, 1974, 49-133580; Nov. 22, 1974, 49-133581; Nov. 22, 1974, 49-133582; Nov. 22, 1974, 49-133584; Dec. 23, 1974, 49-146797; Dec. 28, 1974, 49-149221

Int. Cl.[2] A23L *1/00*

U.S. Cl. 426—62 **23 Claims**

1. A water-soluble and edible thermoplastic molding composition comprising:

a starch material; a protein material; water; an organic, low-molecular-weight plasticizer; and a lubricant;

said starch material being at least one edible, natural, unmodified starch;

said protein material being at least one edible protein salt selected from the group consisting of sodium, potassium and calcium salts of edible, natural protein concentrates;

said organic low-molecular-weight plasticizer being at least one edible, polyhydric alcohol selected from the group consisting of glycerol, ethylene glycol, diethylene glycol, sorbitol, sorbitan, mannitol, maltitol, hydrogenated starch syrup, and sucrose; and

said lubricant being at least one lubricant selected from the group consisting of mono-, di and tri-esters of said edible, polyhydric alcohols with edible higher fatty acids having at least 10 carbon atoms, phosphoric acid derivatives of said esters and lecithin;

said starch containing at least 50% by weight of amylose; the weight ratio of said starch to said protein salt being 30/70 to 70/30; the water content of the composition being 10 to 40% by weight based on the total weight of the composition; and the amount of said organic, low-molecular-weight plasticizer and that of said lubricant being, respectively, 20 to 60 parts by weight and 1 to 11 parts by weight per 100 parts by weight, in total, of said starch and said protein salt.

4,076,847
TEA-COLORED FLAVOR GRANULES

Richard Shaw Johnson, Irby, and John Kenneth Potter, Bromborough, both of England, assignors to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed Oct. 26, 1976, Ser. No. 735,136
Claims priority, application United Kingdom, Oct. 24, 1975, 43848/75
Int. Cl.[2] A23F *3/00*
U.S. Cl. 426—78 **7 Claims**

1. Tea-colored flavor granules adapted to blend uniformly with broken leaf tea comprising water soluble granular carriers, each having a particle size between 0.5 and 2 mm and each containing from 2 to 10% by weight of an extrinsic flavor incorporated therein, each of said carriers being coated with tea powder which, upon infusion, together with said broken leaf tea, forms a beverage which is enhanced by or contrasted with the flavor contained in said carrier, said tea powder having a particle size in the range of 45 to 250 microns.

4,076,848
ENCAPSULATED PULVERIZED DEHYDRATED FRUIT AND VEGETABLE PRODUCT

Eleanor de Limur, 111 Sutter St., San Francisco, Calif. 94104

Filed Mar. 18, 1976, Ser. No. 668,106
Int. Cl.[2] A23B *7/02*
U.S. Cl. 426—89 **3 Claims**

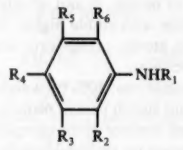
1. A food article comprising a hollow capsule having an interior cavity, said cavity having a volume approximately 1 to 1½ inches long and ⅜ to ½ inch diameter; said cavity filled with a quantity of dehydrated, pulverized fruit and/or vegetable edible matter, hermetically sealed therein, said capsule being formed of a flexible polymeric material and consisting of a hollow cylindrical body portion closed at one end, with an opening at the other end defined by a circular lip portion, a circular cap portion attached to said body portion at said lip portion by a flexible integrally formed tab, said cap portion having an annular groove at its periphery which mates with said circular lip portion when said cap portion is placed across said opening to provide a hermetic seal.

4,076,849
CONTROL OF NITROSAMINE FORMATION IN NITRITE CURED MEAT

Kekhusroo R. Bharucha; Leon J. Rubin, both of Toronto, and Charles K. Cross, Rexdale, all of Canada, assignors to Canada Packers Limited, Toronto, Canada

Filed Oct. 2, 1975, Ser. No. 619,068
Int. Cl.[2] A23B *4/02*
U.S. Cl. 426—266 **20 Claims**

1. a meat treating composition comprising a solution or dispersion of an aromatic secondary amine in a nitrite-containing meat curing solution, the amount of said aromatic secondary amine being effective to reduce the nitrosamine content of nitrite cured meat treated by said composition and cooked at frying temperature, said aromatic secondary amine having the formula:



I

wherein:

R_1 is a hydrocarbon radical of one to eighteen carbon atoms; and R_2, R_3, R_4, R_5 and R_6 are each selected from:

(a) hydrogen,

(b) a hydrocarbon radical as defined for R_1 above,

(c) $—OR_7$ where R_7 is hydrogen or a hydrocarbon radical as defined for R_1 above; or

two adjacent members R_2, R_3, R_4, R_5 and R_6 are cyclized to form the group $—CH_2—_n$ where n is 3 to 5, with the remaining substituents being as defined above; with the proviso that at least one of R_2, R_3, R_4, R_5 and R_6 is $—OR_7$ as defined above.

4,076,850
COMPOSITION AND METHOD FOR SAFELY EXTENDING STORAGE LIFE OF FOODS

John T. R. Nickerson, Onset, and John R. Darack, Framingham, both of Mass., assignors to Dirigo Corporation, Boston, Mass.

Filed Jan. 2, 1976, Ser. No. 646,018
Int. Cl.[2] A23B *4/00*
U.S. Cl. 426—332 **18 Claims**

1. A process for inhibiting the bacterial growth of certain food products while maintaining flavor and texture, said food products consisting of shelled hard-cooked eggs, cooked deshelled shellfish and cooked mushrooms; said process comprising storing such food products under refrigeration in an aqueous solution comprising:

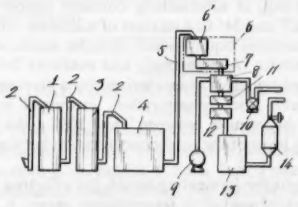
A. a bacterial inhibitor selected from the class consisting of
(1) approximately 0.08 to 0.20% methyl parabenzoic acid, and
(2) a mixture of approximately 0.075 to 0.15% sorbic acid with approximately 0.22 to 0.45% sodium propionate, and

B. a buffering agent in amounts sufficient to maintain the pH of the solution in the range of approximately 4.5 to 5.5 and selected from the group consisting of
(1) a mixture of citric acid and sodium or potassium hydroxide, and
(2) a mixture of
a) sodium or potassium monohydrogen phosphate,
b) sodium or potassium dihydrogen phosphate, and
c) phosphoric acid.

4,076,851
METHOD AND APPARATUS FOR PRODUCING FINE DEODORIZED SOYBEAN POWDER

Tutae Tunoda, Oaza Joshikimen 944-1, Fukaya (Saitama), Japan

Filed Jan. 6, 1977, Ser. No. 757,147
Claims priority, application Japan, Sep. 9, 1976, 51-108241
Int. Cl.[2] B02B *3/00*
U.S. Cl. 426—431 **10 Claims**



1. A method of producing fine deodorized soybean powder, comprising the steps of:

washing raw soybeans;

pressing said soybeans flat to a degree not to remove fat from said soybeans;

drying the pressed soybeans in a substantially low temperature environment of approximately 50°-60° C to attain a first predetermined moisture content of approximately 3%;

coarsely grinding the soybeans to a coarse grain size and separating the soybean seed coats from the soybean seed leaves;

deodorizing said soybean leaves by digesting said leaves;
removing excess moisture from said soybean leaves so that said soybean leaves attain a second predetermined moisture content lower than said first predetermined moisture content;
intermediately grinding said soybean leaves to an intermediate grain size; and
finely grinding the intermediately ground soybean leaves to a fine grain size.

8. An apparatus for producing fine deodorized soybean powder from raw soybeans, comprising:
means for washing said raw soybeans;
said washing means communicating by way of soybean conveying means with means for pressing said soybeans flat to a degree not to remove fat from said soybeans;
said pressing means communicating by way of soybean conveying means with means for drying the pressed soybeans in a substantially low temperature environment of approximately 50°–60° C to attain a first predetermined moisture content of approximately 3%;
said drying means communicating by way of soybean conveying means with means for coarsely grinding the soybeans to a coarse grain size and separating the soybean seed coats from the soybean seed leaves;
said coarse grinding and separating means communicating by way of soybean conveying means with digesting means for deodorizing said soybean leaves;
said digesting means communicating by way of soybean conveying means with means for removing excess moisture from said soybean leaves so that said soybean leaves attain a second predetermined moisture content lower than said first predetermined moisture content;
said excess moisture removing means communicating by way of soybean conveying means with means for intermediately grinding said soybean leaves to an intermediate grain size; and
said intermediate grinding means communicating by way of soybean conveying means with means for finely grinding the intermediately ground soybean leaves to a fine grain size.

4,076,852

EDIBLE COMPOSITIONS HAVING A MEAT FLAVOR AND PROCESSES FOR MAKING SAME

Andries Van Delft, Nieuw Loosdrecht, Netherlands, and Christopher Giacino, Califon, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 334,894, Feb. 22, 1973, abandoned. This application Mar. 15, 1974, Ser. No. 451,470
The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.
Int. Cl.[2] A23L *1/227*
U.S. Cl. 426—533 **4 Claims**

1. A process for preparing an edible poultry-flavored foodstuff flavor composition comprising the steps of (A) intimately admixing in the absence of any natural meat products except enzymatic chicken meat digest, a composition consisting essentialy of (i) a poultry egg product selected from the group consisting of powdered chicken egg yolk, enzymatic digest of the whole internal contents of poultry egg and enzymatic digest of poultry egg yolk; (ii) L-cysteine hydrochloride; (iii) thiamine hydrochloride and (iv) enzymatic chicken meat digest, said poultry egg product, said L-cysteine hydrochloride, said thiamine hydrochloride and said enzymatic chicken meat digest each being present in an amount to produce a poultry meat flavor, the weight ratio of said thiamine hydrochloride:-cysteine hydrochloride being from 0.25:1 up to 1:1, and (B) heating the resulting mixture at a temperature of from 100° C up to 350° C and for a period of time of from 0.2 hrs. up to 10 hrs. whereby a poultry meat flavored product is produced.

4,076,853

FLAVORING WITH SUBSTITUTED NORBORNANE DERIVATIVES

Kenneth K. Light, Long Branch; James Milton Sanders, Eatontown; Manfred Hugo Vock, Locust, all of N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin Vinals, Red Bank, N.J.; William L. Schreiber, Jackson, N.J.; John B. Hall, Rumson, N.J.; Denis E. Hruza, Sr., Bricktown, N.J.; Venkatesh Kamath, Red Bank, N.J.; Braja Dulal Mookherjee, Holmdel, N.J.; Ching Y. Tseng, Middletown, N.J., and Mark A. Sprecker, Sea Bright. N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Feb. 4, 1977, Ser. No. 765,847
Int. Cl.[2] A23L *1/226*
U.S. Cl. 426—538 **4 Claims**

1. A process for augmenting or enhancing the flavor of a foodstuff comprising adding to said foodstuff from about 0.5 ppm up to about 500 ppm of at least one compound selected from group consisting of alpha-allyl-3,3-dimethyl-2-norbornanemethanol, alpha-methallyl-3,3-dimethyl-2-norbornanemethanol and alpha-allyl-alpha-3, 3-trimethyl-2-norbornanamethanol.

4,076,854

FLAVORING WITH A CYCLOHEXADIENE DERIVATIVE

Kenneth K. Light, Long Branch; Bette M. Spencer, Ocean Grove; Joaquin F. Vinals, Red Bank, all of N.J.; Jacob Kiwala, Brooklyn, N.Y.; Manfred Hugo Vock, Locust, N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Mar. 3, 1977, Ser. No. 774,058
Int. Cl.[2] A23L *1/226*
U.S. Cl. 426—538 **2 Claims**

1. A process for augmenting or enhancing the organoleptic properties of a foodstuff comprising the step of adding to said foodstuff from 0.5 parts per million up to about 100 parts per million based on the total composition of 4-butyl-3,4,5 -trimethyl-2,5-cyclohexadiene-1-one.

4,076,855

SOLUBLE COFFEE PROCESS

William S. Ryder, Orangeburg, and Joseph F. Mezzino, Pearl River, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 16, 1973, Ser. No. 333,100
Int. Cl.[2] A23F *1/08*
U.S. Cl. 426—594 **4 Claims**

1. A soluble coffee process which renders soluble normally insoluble constituents of coffee extract comprising the steps of:
a. obtaining a coffee extract,
b. removing said insoluble constituents from the coffee extract,
c. adding to an aqueous dispersion of said constituents an alkaline material in an amount sufficient to raise the pH of said dispersion to at least about 7.0 but below 9.0,
d. incorporating the alkaline-containing dispersion into a coffee extract from which insolubles have been removed, and then
e. drying the extract of step (d).

4,076,856

METHYL XANTHINE ANTAGONISM

Benjamin R. Zeitlin, Suffern; Alan B. Pritchard, Ithaca, both of N.Y., and Harold S. Levenson, Stamford, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 431,797, Jan. 9, 1974, Pat. No. 4,007,290, and Ser. No. 511,405, Oct. 2, 1974, abandoned. This application Mar. 23, 1976, Ser. No. 669,573

The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.

Int. Cl.[2] A23F *1/00, 3/00;* A23G *1/00*

U.S. Cl. 426—594 9 Claims

1. A composition for preparing a coffee beverage comprising (a) coffee containing caffeine said coffee being selected from the group consisting of roasted coffee, soluble coffee and combinations thereof, and (b) a caffeine antagonist added to said coffee to provide an amount effective to at least partially antagonize the sleep disturbing effects of the caffeine present in the coffee beverage, said antagonist being comprised of (1) nicotinic acid or soluble salt thereof added to said coffee to provide an amount of from about 4% to 85% by weight of the caffeine present and sufficient to provide from about 6 mg to about 50 mg per cup of coffee beverage prepared from said coffee material, wherein a cup of coffee beverage comprises an aqueous solution containing from about 1.5 to 2.0 grams of soluble coffee solids, and (2) a member selected from the group consisting of nicotinamide or a salt thereof added to said coffee to provide an amount of from about 6 to 500% by weight of the caffeine present, trigonelline or a salt thereof added to said coffee to provide an amount of from about 7 to 500% by weight of the caffeine present, pyridine-2, 3-dicarboxylic acid or a salt thereof added to said coffee to provide an amount of from about 0.3 to 330% of the weight of caffeine present, 3-hydroxymethyl pyridine or a salt thereof added to said coffee to provide an amount of from about 0.6 to 330% by weight of the caffeine present and, pyridoxine or salt thereof added to said coffee to provide an amount of from about 0.4 to 85% of the weight of the caffeine present.

4,076,857

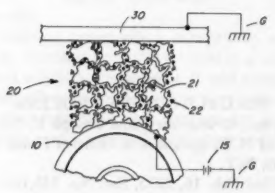
PROCESS FOR DEVELOPING ELECTROGRAPHIC IMAGES BY CAUSING ELECTRICAL BREAKDOWN IN THE DEVELOPER

George Philip Kasper, and John Walter May, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,248

Int. Cl.[2] G03G *13/06, 13/08, 13/09*

U.S. Cl. 427—18 13 Claims



1. An electrographic process wherein a support bearing an electrostatic charge pattern is developed using an electrographic developer composition comprising marking particles and having a predetermined electrical breakdown value, said process comprising:

contacting the electrostatic charge pattern with the developer composition in a development area for a time period sufficient to deposit marking particles onto the electrostatic charge pattern thereby developing the image;

controlling the development process in the development area to establish across the developer composition in the development area during such time period an electrical field greater than the electrical breakdown value of the developer, thereby causing the developer composition to undergo electrical breakdown in the development of the electrostatic charge pattern.

4,076,858

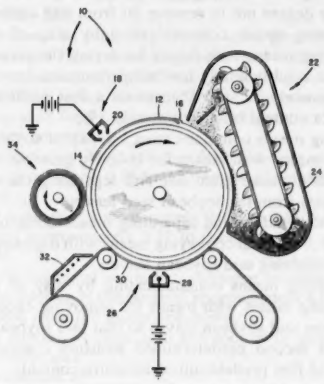
ELECTROSTATIC COPYING PROCESS WITH CHARGING OF THE ORIGINAL

Richard C. Keezer, Los Altos, Calif., and Werner E. L. Haas, Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 10, 1974, Ser. No. 513,768

Int. Cl.[2] G03G *13/04, 13/08, 13/22*

U.S. Cl. 427—19 6 Claims



1. A method for electrostatically copying an original document using an electrically conductive grounded plate, said document being comprised of ordinary paper having a fused toner image on a front side thereof, said paper and said image having different electrical properties comprising either the acceptance of different amounts of electrostatic charge, respectively, or if the charge is accepted equally, then discharging differently, respectively, comprising the steps of:

placing the front side of said document in contact with said conductive plate;

uniformly depositing an electrostatic charge on the backside of said document whereby portions of said charge are dissipated to form an electrostatic image thereon;

developing said electrostatic image, and

transferring the developed image to a support material.

4,076,859

PROCESS FOR METALLIZING STRIPS, SHEETS OR THE LIKE

Hermann Johannes Schladitz, Munich, Germany, assignor to Schladitz-Whiskers AG, Zug, Switzerland

Division of Ser. No. 486,956, Jul. 10, 1974, abandoned. This application Jul. 23, 1975, Ser. No. 598,337

Claims priority, application Germany, Aug. 29, 1973, 2342499

Int. Cl.[2] C23C *11/02*

U.S. Cl. 427—55 2 Claims

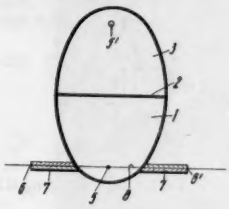
1. A process for metallizing strips, sheets or other generally flat material by depositing metal out of an atmosphere containing a gaseous metallic compound, consisting essentially of the steps of:

providing a heat decomposable gaseous metallic compound;

providing a focal line closely adjacent to or on one surface of said material to be metallized using an optical system,

focusing heat radiation at the focal line to heat said focal line to a temperature above the decomposition temperature of said gaseous metallic compound whereby metal for deposition is produced from said compound along said focal line,

said step of heating being carried out such that heat is substantially confined to said focal line adjacent to or on said one surface and the heating of said material is substantially confined to said one surface such that the temperature of



the entire cross section of said material being metallized is not raised to said decomposition temperature; and,

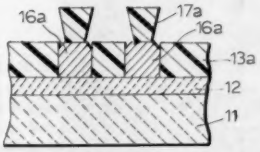
continuously moving said material to be metallized transversely past said focal line to accomplish surface metallization thereof.

4,076,860

METHOD OF FORMING ELECTRODE WIRINGS IN SEMICONDUCTOR DEVICES

Hiroshi Kuroda, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Aug. 18, 1976, Ser. No. 715,643
Claims priority, application Japan, Aug. 20, 1975, 50-101336
Int. Cl.[2] B05D *1/32, 5/12;* C23C *13/02*
U.S. Cl. 427—91 **6 Claims**



1. A method of forming electrode wirings in semiconductor devices, which comprises the steps of:

forming a first masking pattern having a configuration inverse to the pattern of the desired electrode wirings on the surface to be provided with such electrode wirings;

evaporation depositing a conductor onto said masking pattern from above for forming a conductor layer covering both said masking pattern and the nonmasked areas of said surface and having depressions therein over the nonmasked areas of said surface;

applying a layer of mask-forming material on said conductor layer;

removing the surface portion of said layer of mask-forming material only to the extent that all the upper surfaces of the parts of said conductor layer above the parts of said first masking pattern are exposed to form a second masking pattern;

etching said exposed parts of the conductor layer with said second masking pattern as the etching mask to the extent that said first masking pattern is exposed; and removing said first and second masking patterns.

4,076,861

MAGNETIC RECORDING SUBSTANCE

Masahiko Furukawa; Hiroshi Ogawa; Masashi Aonuma; Yasuo Tamai; Hiromi Nakahara, and Masaaki Igarashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Jan. 5, 1976, Ser. No. 646,597
Claims priority, application Japan, Jan. 14, 1975, 50-5895
Int. Cl.[2] C22C *1/00;* H01F *1/02*
U.S. Cl. 427—132 **8 Claims**

1. A process for the production of a magnetic recording substance comprising a support and a magnetic layer containing a ferromagnetic metal powder in a binder, which process comprises:

a. reducing a ferromagnetic metal salt in aqueous solution with a reducing agent to produce a ferromagnetic metal powder, said ferromagnetic metal powder containing 50% by weight of one or more of at least one metal selected from the group consisting of Fe, Co, Ni, Fe-Co, Fe-Ni, Co-Ni and Fe-Co-Ni;

b. forming an aqueous slurry containing said ferromagnetic metal powder in a ratio of powder to water of 100:1 to 1:50 by weight;

c. adding to said aqueous slurry an organic solvent selected from the group consisting of butyl acetate, m-xylene, isoamyl alcohol, chloroform, butyl ether and methylisobutyl ketone, in a water to organic solvent ratio of 30:1 to 1:100 by weight of said organic solvent to water;

d. subjecting the resultant mixture of c) to azeotropic distillation to form a minimum boiling azeotrope to thereby substantially remove the water from said slurry and yet leave sufficient organic solvent to form a dispersion of said ferromagnetic powder therein;

e. dispersing a binder in said dispersion of ferromagnetic metal powder in said organic solvent and

f. coating the resultant dispersion of e) onto a support.

4,076,862

METHOD OF TREATING EARTHEN AREAS

Walter Dan Kobeski, Milton, W. Va.; Sigismund Walter Srocki, Streamwood; William Ivan Blosser, Wheeling, both of Ill., and James Joseph Needham, Marietta, Ga., assignors to United States Gypsum Company, Chicago, Ill.

Continuation of Ser. No. 408,034, Oct. 19, 1973, abandoned.
This application Aug. 7, 1975, Ser. No. 602,869
Int. Cl.[2] B05C *1/16*
U.S. Cl. 427—136 **12 Claims**

1. A method of preventing combustion in combustible earthen banks which comprises the steps of:

(1) forming a composition consisting essentially of an aqueous slurry of calcium sulfate hemihydrate and a minor amount of a defoamer, the hemihydrate particles having a surface area of about 4000 to about 16,000 square centimeters per gram with less than about 0.5% by weight of greater than 50 mesh particles, the water being present in an amount of about 25% by volume to about 56% by volume above normal consistency for the hemihydrate;

(2) applying said composition to the surface of the area to be treated; and

(3) allowing the applied composition to set whereby there is formed a dense, substantially air-impermeable and nonporous layer substantially inhibiting gas flow and radiant heat from the surface of the treated area.

4,076,863

PROCESS FOR CUTTING AND EDGING CHEMICALLY PRE-STRENGTHENED FINISHED UNCUT LENS BLANKS WITHOUT LOSS OF IMPACT RESISTANCE

Fumio Onoki, Tokorozawa; Kazuo Namiki, Tokyo, and Tetsuo Osora, Fussa, all of Japan, assignors to Hoya Lens Corporation, Tokyo, Japan

Filed Sep. 2, 1976, Ser. No. 719,720
Claims priority, application Japan, Feb. 23, 1976, 51-18630
Int. Cl.[2] G02B *1/10*; B05D *3/02, 1/38, 5/06*
U.S. Cl. 427—165 8 Claims

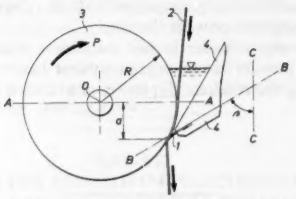
1. A process for preventing a decrease in the impact resistance of chemically strengthened ophthalmic glass lens blanks after a cutting and edging process, which comprises coating the surface of the lens edge with one or more coatings of at least one of the starting material compositions for epoxy resins, alkyd resins, polyurethane resins, unsaturated polyester resins, acrylic resins, or cyanoacrylates, and then polymerizing the resulting edge coating or coatings at a temperature of up to 200° C to form a polymeric edge coating.

4,076,864

METHOD AND APPARATUS FOR COATING BOTH SIDES OF A MOVING WEB

Hans Ivar Wallsten, Lausanne, Switzerland, assignor to Inventing S.A., Lausanne, Switzerland

Filed Aug. 24, 1976, Ser. No. 717,187
Claims priority, application Sweden, Aug. 26, 1975, 7509461
Int. Cl.[2] B05D *3/12*
U.S. Cl. 427—209 10 Claims



1. A method of coating both faces of a moving web, such as a paper web, comprising feeding the web longitudinally at a speed in excess of 300 meters per minute between a moving support member and a blade, the blade and the support member forming a nip, feeding coating material into the nip to produce a dam of coating material whereby the web is coated on both faces, controlling the angle of the blade so that it extends at an angle less than 20° to the web and choosing the bevel width, measured in the direction of movement to the web, to be at most 0.15 cm, said blade being urged against the web with a force not exceeding 2 kgf per cm width of web.

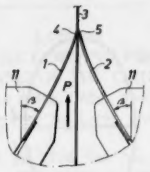
4,076,865

METHOD AND APPARATUS FOR COATING BOTH SIDES OF A MOVING WEB, USING BLADES

Hans Ivar Wallsten, Lausanne, Switzerland, assignor to Inventing S.A., Lausanne, Switzerland

Filed Aug. 24, 1976, Ser. No. 717,383
Claims priority, application Sweden, Aug. 26, 1975, 7509460
Int. Cl.[2] B05D *3/12*
U.S. Cl. 427—209 9 Claims

1. A method of coating both faces of a moving web, such as a paper web, comprising feeding the web longitudinally at a speed in excess of 200 meters per minute, applying a coating material to each face of the web, smoothing the coating material by means of two blades, one biased against each face, said blades each having a bevel at the point of contact with the web, controlling the angle of the blades so that they each extend at an angle less than 25° to the web and choosing the bevel width, measured in the direction of movement of the web, to be at most 0.08 centimeters, said blade being urged



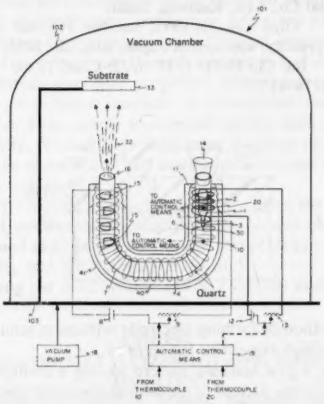
against the web with a force not exceeding 0.20 kgf per centimeter width of web.

4,076,866

METHOD OF GROWING FILMS BY FLASH VAPORIZATION

Nicolaos S. Platakis, San Jose, Calif., and Harry C. Gatos, Weston, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 30, 1975, Ser. No. 573,240
Int. Cl.[2] C23C *13/02*
U.S. Cl. 427—250 4 Claims

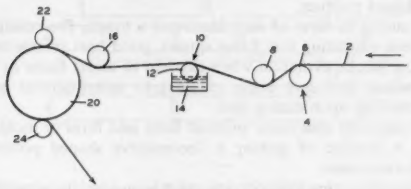


1. A method of making a film from a feed material whose constituents have large differences in vapor pressure, that comprises, disposing said feed material in an ampoule whose only outlet is a capillary tube, disposing the ampoule in a partly closed and heated environment, establishing the temperature of the environment to be well above the vaporization temperature of the consituent of the feed material having the highest vaporization temperature, establishing a temperature within the ampoule at a level that will effect melting of all the feed material constituents therein into a homogeneous liquid melt and cause the melt thereby formed to emit from the ampoule through the capillary tube into the heated environment where the emitted melt is wholely and instantly vaporized, and depositing the vapor, thus formed, upon a surface to form a film thereon, the film containing constituents in the same ratio as the constituents of the feed material.

4,076,867
MULTILEVEL EMBOSSING OF FOAMED-SHEET MATERIALS

Walter J. Lewicki, Jr., Lancaster, and William M. McQuate, Reinholds, both of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Feb. 28, 1975, Ser. No. 554,321
Int. Cl.[2] B05D *5/00*
U.S. Cl. 427—264 5 Claims



1. In a process for embossing a web of material wherein said material is composed of a composite structure having a carrier, a non-foamed embossable wear layer and a foamed layer therebetween, said foamed layer on the surface thereof adjacent the wear layer having a decorative pattern printed thereon, said above composite structure being in the form of a web which is first heated to a temperature of about 250° F. to 350° F., the improvement comprising:

a. then after heating, wetting the carrier of the web, which is the back surface of the web, so as to lower the temperature of the back surface of the foam and the backing approximately 100° below the temperature of the top surface of the web, which is the non-foamed embossable layer,

b. embossing the top surface of the web wherein the embossing means and its resulting embossing deeply penetrate the web, both the land areas and valley areas of the embossing means contact and impress a pattern on the top surface of the web, and

c. cooling the embossed surface of the web to set the embossed pattern in the web.

4,076,868
RENDERING BUILDING MATERIALS HYDROPHOBIC

Michael Roth, and Erhard Bosch, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Continuation of Ser. No. 522,660, Nov. 11, 1974, abandoned. This application Apr. 29, 1976, Ser. No. 681,354
Claims priority, application Germany, Nov. 9, 1973, 2356142
Int. Cl.[2] B05D *3/12;* B32B *13/12*
U.S. Cl. 427—348 15 Claims

1. A process for simultaneously cleaning and rendering a preformed building material hydrophobic, which comprises (1) applying to the surface of the building material selected from the group consisting of concrete, bricks, glazed ceramic tiles and plaster, a composition consisting essentially of a hydrophobic agent selected from the group consisting of organopolysiloxanes having siloxane units of the general formula $R_nH_mSiO_{(4-m-n)/2}$, silanes of the formula R_nSiX_{4-n} and partial hydrolysates thereof, alkali metal hydrocarbon siliconates of the formula $R'Si(OH)_2OM$ and polymers having units of the formula $R'SiO(OM)$ and mixtures thereof, wherein R is selected from the group consisting of alkyl and aryl radicals having up to 18 carbon atoms, R' is selected from the group consisting of a monovalent hydrocarbon radical having up to 5 carbon atoms and a phenyl radical, M represents an alkali metal atom, X represents a hydrolyzable radical, *n* denotes 0, 1, 2, or 3 and *m* denotes 0 or 1, and in the polysiloxane the average value of the *n* is from 0.9 to 1.8, and *n* is 1 in at least 50 percent of the number of siloxane units, a solvent for the hydrophobic agent in which the hydrophobic agent is present in an amount of from 0.2 to 50 percent by weight based on the weight of the hydrophobic agent and solvent and a residue forming filler having a surface area of at least 50 m^2/g, in an amount of from 1 to 25 percent by weight based on the total weight of the hydrophobic agent and solvent, (2) removing the solvent by evaporation to form a filler residue on the surface of said building material and thereafter (3) removing the filler residue from said surface to simultaneously clean and render said building material hydrophobic.

4,076,869
HARDENABLE EPOXY RESIN COMPOSITIONS AND PROCESS FOR MAKING THE SAME

Robert Flynn, Toms River, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 271,872, July 14, 1972, Pat. No. 3,901,833, which is a continuation-in-part of Ser. No. 83,626, Oct. 23, 1970, Pat. No. 3,679,465, which is a continuation-in-part of Ser. No. 877,477, Nov. 17, 1969, abandoned. This application Aug. 15, 1975, Ser. No. 605,084
Int. Cl.[2] B05D *3/02*
U.S. Cl. 427—386 11 Claims

1. A method for making a reinforced epoxy composition which comprises dissolving an 1,2-epoxy resin containing two or more epoxy groups, and a conventional curing agent therefor in a nonreactive solvent boiling at from 30° to about 100° C, passing a reinforcing substrate through the solution and exposing the impregnated substrate to a temperature of from 400° to 950° F to evaporate the solvent, the conditions of temperature and time of exposure being so adjusted and controlled that the resulting composite has a retained solvent level below 0.5% and is substantially uncured.

4,076,870
PROCESS FOR TREATING FIBROUS PRODUCTS CONTAINING CELLULOSIC FIBERS

Kazuhide Yamamoto, Uji, Japan, assignor to Daido-Maruta Finishing Co. Ltd., Kyoto, Japan

Filed Sep. 27, 1976, Ser. No. 726,955
Claims priority, application Japan, Oct. 1, 1975, 50-117636; Oct. 1, 1975, 50-117637
Int. Cl.[2] D06M *1/00, 13/34;* D05D *3/02*
U.S. Cl. 427—390 C 11 Claims

1. In a process for modifying a fibrous product containing cellulosic fibers, by impregnating said fibrous product with a treating liquor containing a chemical textile finishing agent, and then heat-treating the impregnated fabric in the presence of an acid catalyst, the improvement which comprises using as said acid catalyst a fluorocarboxylic acid of the formula

$$C_nF_pH_qCOOH$$

wherein *n* is an integer of 1 to 5, *p* is 2 to 10, and *q* is 0 or 1, with the proviso that the sum of *p* and *q* equals $2n + 1$ the amount of said fluorocarboxylic acid being 0.01 to 1.5% by weight based on the weight of the treating liquor.

4,076,871
METHOD OF IMPREGNATING WOOD WITH BORIC ACID

Buddy M. Short, Ovett, and Jerry W. Rayfield, Laurel, both of Mich., assignors to Masonite Corporation, Chicago, Ill.

Filed Nov. 2, 1976, Ser. No. 738,278
Int. Cl.[2] B05D *3/02, 1/18*
U.S. Cl. 427—397 6 Claims

1. Method of impregnating wood with boric acid or boron oxide, which comprises applying thereto a boric acid ester of an organic alcohol, heating the wood to cause the ester to penetrate into the wood, and hydrolyzing said ester to deposit boric acid or boron oxide therein.

4,076,872

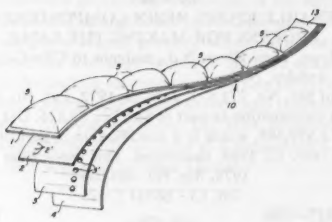
INFLATABLE CELLULAR ASSEMBLIES OF PLASTIC MATERIAL

Stephen Lewicki, 7 Forest View Road, Wallingford, Pa. 19086; Gregory David Lewicki, 47 Springhouse Lane, Media, Pa. 19063, and Stephen Jon Lewicki, 7 Forest View Road, Wallingford, Pa. 19086

Filed Mar. 16, 1977, Ser. No. 778,249

Int. Cl.[2] A45B *19/00;* **A45C** *7/00*

U.S. Cl. 428—12 **11 Claims**



1. An inflatable laminated pad of plastic sheet material, comprising

(a) an elongated outer wear-resistant sheet of plastic material provided with a plurality of discrete collapsed but extensible bubbles along the length thereof,

(b) a second elongated outer wear-resistant sheet of plastic material sealed to said first sheet along the longitudinal edges common to both sheets, whereby the injection of a compressed gas into the space between said sheets effects the distension of said bubbles, and

(c) at least one intermediate layer of thin apertured plastic sheeting between said outer layers to permit the expansion of said bubbles to a degree sufficient to build up a pressure of such intensity on the solid areas of said intermediate layer as will force said apertured layer into contact with said second sheet to seal off the communication between said outer sheets when the gas pressure is removed from the inner face of said second outer sheet.

4,076,873

RESORCINOL-ALDEHYDE RESINS USED TO BIND REINFORCING MATERIALS SUCH AS GLASS FIBERS IN SHAPED OBJECT FORM

Lawrence E. Shea, 165 Lake Drive, San Bruno, Calif. 94066

Division of Ser. No. 691,290, Jun. 1, 1977, Pat. No. 4,053,447, which is a continuation-in-part of Ser. No. 492,881, Jul. 29, 1974, abandoned. This application Jul. 6, 1977, Ser. No. 813,338

Int. Cl.[2] B29F *23/12;* **B65H** *81/06;* **E04C** *2/22;* **F16L** *9/04, 9/12, 9/16*

U.S. Cl. 428—35 **10 Claims**

1. A fire-resistive duct comprising wound glass filaments formed of rovings coated with a tough, fire-resistive resin exhibiting low flame spread and low smoke evolution under exposure to direct flame or to radient heat and being the reaction product of a partially cured resin of resorcinol, phenol and formalin, and paraformaldehyde and at least one substance chosen from the group consisting of furfural and furfuryl alcohol, said paraformaldehyde and said substance being added in amounts sufficient to provide said fire-resistive resin.

3. A construction panel comprising a laminate of glass cloth and a fire-resistive resin which is the reaction product of 100 parts by weight of an A component which is a partially cured resin of resorcinol, phenol, and formalin, and 30 parts by weight of a B component which consists essentially of 3 parts by weight paraformaldehyde and 12 parts by weight of furfural.

6. A method of making a fire-resistive shaped product including tanks, ducts and pipes, which comprises:

(1) coating glass roving with an admixture consisting essentially of: (a) a resorcinol component chosen from the group consisting of resorcinol, a mixture of resorcinol and phenol, and a partially cured resin of resorcinol, phenol and formalin, (b) paraformaldehyde, plus, (c) at least one substance chosen from the group consisting of furfuraldehyde and furfuryl alcohol, (d) said paraformaldehyde and said substance being each added in an amount sufficient to produce with said resorcinol component a tough, fire-resistive resin,

(2) forming filaments of such coated roving,

(3) winding said filaments on a form or mold to produce a shaped product,

(4) curing to form of said admixture a tough, fire-resistive resin exhibiting low flame spread, good heat release and low smoke evolution when exposed to direct flame or to radiant heat and being resistant to embrittlement and cracking upon curing, and

(5) removing said cured product from said form or mold.

10. A method of making a fire-resistive shaped product which comprises:

(1) incorporating a reinforcing agent in an admixture consisting essentially of: (a) a resorcinol component chosen from the group consisting of resorcinol, a mixture of resorcinol and phenol, and a partially cured resin or resorcinol, phenol and formalin, (b)paraformaldehyde and (c) at least one substance chosen from the group consisting of furfural and furfuryl alcohol, (d) said paraformaldehyde and said substance being added in amounts sufficient to provide said fire-resistive resin,

(2) forming such incorporated agent and resin into a desired shape, and

(3) curing to form of said admixture a fire-resistive resin exhibiting low flame spread, good heat release and low smoke evolution when exposed to direct flame or to radiant heat and being resistant to embrittlement and cracking upon curing.

4,076,874

TACK SPUN PILE SURFACED PRODUCTS

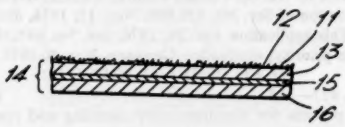
Anton Alfred Arthur Giovanelli, Oestringen, and Eckhard Wolfgang Schmidt, Kirrlach, both of Germany, assignors to Imperial Chemical Industries Limited, London, England

Filed Sep. 8, 1975, Ser. No. 611,242

Claims priority, application United Kingdom, Sep. 13, 1974, 40001/74

Int. Cl.[2] D03D *27/00;* **D04H** *11/00*

U.S. Cl. 428—35 **14 Claims**



1. A process for the production of pile surfaced products in which the pile is produced by tack-spinning thermoplastic polymer composition onto one or both external surfaces, of a foundation layer which comprises at least two sheets which adhere together using an adhesive having a softening point similar to that of the thermoplastic polymer composition.

4,076,875

ORNAMENTAL DESIGN

Rene L. E. Van Gasse, Opglabbeek, Belgium, assignor to All Decostone, N.V., Opglabbeek, Belgium

Filed Feb. 2, 1976, Ser. No. 654,235

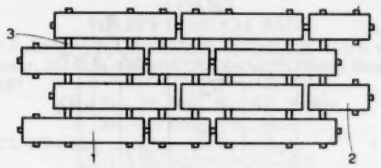
Claims priority, application Netherlands, Feb. 7, 1975, 7501450

Int. Cl.[2] B32B *3/10, 7/02*

U.S. Cl. 428—44 **13 Claims**

13. An ornamental tile-shaped part suitable for being embed-

ded in a base material or joined to similar tile-shaped parts, each of said parts having a front face, a rear face, a plurality of sides and a predetermined thickness, one or more leg members being fixedly attached to said rear face adjacent the side edge of said rear face along each of said plurality of sides and a bridging section fixedly attached to each said leg member and spaced vertically above said rear face a first predetermined distance, said bridging section extending away from said tile-



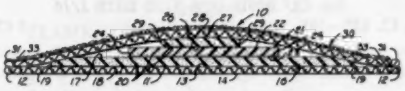
shaped part and beyond the sides thereof by a second predetermined distance whereby when said tile-shaped parts are joined together in a base material bridging sections of adjacent tile-shaped parts will connect to bridging sections of adjacent tile-shaped parts thereby spacing apart said tile-shaped parts by a third predetermined distance with said first predetermined distance together with the thickness of said tile-shaped parts being equal to or larger than said third predetermined distance.

4,076,876

FOOT TENSION RELAXER

Alfred H. Bowles, W. 904 Lincoln Place, Apt. No. 4, Spokane, Wash. 99204

Filed May 2, 1977, Ser. No. 792,777
Int. Cl.[2] A47C *9/12*
U.S. Cl. 428—71 **7 Claims**



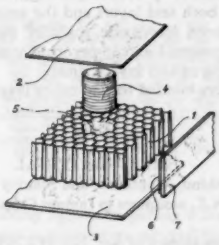
1. A foot tension relaxer, comprising:
- a flat base of selected length and width dimensions and having areal upper and lower surfaces;
- a first cushion member formed of a resilient material with a lesser length and width dimension that the base and having upper and lower areal surfaces thereon with the lower areal surface thereof affixed to the upper surface of the base;
- a second cushion member formed of a resilient material having a length dimension equal to that of the first cushion member and a width dimension less than the width dimension of the first cushion member and also having an upper and lower areal surface with the lower areal surface affixed to the upper areal surface of the first cushion member and extending along the longitudinal center line of the first cushion member;
- a third cushion member formed of resilient material having a length dimension equal to that of the first cushion member and a width dimension less than that of the second cushion member and also having an upper and a lower areal surface with the lower areal surface affixed to the upper areal surface of the second cushion member and extending along the longitudinal center line of the first cushion member; and
- a flexible cover member similar in size to the flat base and joined to the base at the peripheral edges thereof such that it covers the first, second and third cushion members and assumes an arched configuration similar to that of the arch of the human foot due to the configuration of the three joined cushion members.

4,076,877

CELLULAR STRUCTURE PLATE

Wilhelm Tanzen, Nordenham, Germany, assignor to Vereinigte Flugtechnische Werke - Fokker GmbH, Bremen, Germany

Filed May 12, 1975, Ser. No. 576,786
Claims priority, application Germany, May 24, 1974, 2425014
Int. Cl.[2] B32B *3/12*
U.S. Cl. 428—73 **3 Claims**



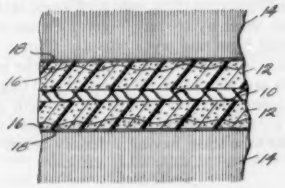
1. Cellular structure plate with well defined locations for taking up external forces, comprising:
- a flat filler plate having cell structure and a plurality of recesses, respectively at the said locations, each recess being larger than the cells of the structure;
- insert bodies inserted in the recesses and made of heat curable, laminated resin plastic, heat cured when inserted;
- a skin covering top and bottom of the filler plate including the insert bodies and being also made of plastic heat cured when applied to the plate, the skins being bonded to the insert bodies as a result from curing when in place; and
- a laminated ribbon having a precured resin outer layer a curable resin inner layer wrapped around the plate and heat cured thereafter.

4,076,878

FLAME-RETARDANT FLOCKED FABRIC

Llaney C. Norby, Kennebunkport, Me., assignor to West Point-Pepperell, Inc., West Point, Ga.

Continuation-in-part of Ser. No. 611,684, Sep. 9, 1975, abandoned. This application Sep. 27, 1976, Ser. No. 726,438
Int. Cl.[2] B32B *33/00*
U.S. Cl. 428—90 **15 Claims**



1. A flame-retardant flocked fabric comprising:
- (a) a reinforcing support of textile material;
- (b) a sheet of closed cell polyurethane foamed material bonded to at least one surface of said textile material;
- (c) a flame-retardant adhesive system disposed over an exposed surface of said sheet in two separate layers,
- one of said layers comprising in a cured adhesive vehicle a flame-retardant component combination of a brominated aromatic compound and antimony trioxide, said one layer impregnating the exposed surface of said sheet, and
- the other of said layers comprising in a cured adhesive vehi-

cle, aluminum hydroxide as a flame-retardant component, said other layer covering said one layer,

said flame-retardant component combination being present in said one layer in an amount between 71–99 percent by weight of the total weight of flame-retardant components in both said layers, the total flame-retardant components in both said layers being between 21–49 percent by weight of the total weight of both said layers, the flame-retardant component in said other layer being about 1–30 percent by weight of the weight of the adhesive vehicle (wet basis) present in said other layer, the brominated aromatic compound in said one layer being present in an amount between 3 and 22 percent by weight based on the total weight of both said layers and the antimony trioxide and the aluminum hydroxide together being present in an amount between 1 and 15 percent by weight based on the total weight of said layers, and

(d) flock fibers bonded to said other layer.

4,076,879

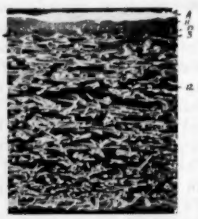
SHEET MATERIAL

Stuart Paul Suskind, Montclair, and Stanley George Sova, Clifton, both of N.J., assignors to Inmont Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 512,265, Oct. 4, 1974, abandoned. This application Sep. 25, 1975, Ser. No. 616,714

Int. Cl.[2] B32B *5/12, 7/02*

U.S. Cl. 428—113 **6 Claims**



1. A sheet product having a thickness of about 30 to 60 mils and an elongation over 200% and having a leather-like "break," comprising a base sheet of criss-crossing elastomeric polyurethane fibers, having an average diameter of about 5 to 20 microns, running parallel to the surfaces of the sheet, said fibers being bonded together at their points of contact, said product having a substantially non-porous elastomeric surface skin layer up to about 100 microns thick, comprising a substantially non-porous elastomeric polyurethane preformed skin about 20 to 50 microns thick, said preformed skin being bonded to said base sheet by spaced fingers of elastomeric adhesive which extend from said layer into said fibrous base sheet and which reinforce the fiber-to-fiber bonds in the zone of the base sheet below said skin layer, the bases of said fingers adjacent to said layer comprising less than half the length of said layer, as viewed in cross section perpendicular to said layer, the lower third of said base sheet having a density below 0.4 g/cc.

4,076,880

MASTIC COMPOSITION AND COMPOSITE STRUCTURAL PANELS FORMED THEREFROM

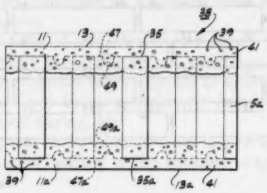
Robert C. Geschwender, Lincoln, Nebr., assignor to Lancaster Research and Development Corporation, Lincoln, Nebr.

Continuation of Ser. No. 381,073, Jul. 20, 1973, abandoned. This application Apr. 30, 1975, Ser. No. 573,129

Int. Cl.[2] B32B *3/12*

U.S. Cl. 428—116 **7 Claims**

1. A composite structural panel comprising a cellular honeycomb core of thermally insulative material having opposite faces and walls between each cell, the cells extending from one face thereof to the other, the walls having opposite edges constituting the opposite faces of the core, a layer of an impervious heat and sound retardant composition on each of the opposite faces and penetrating into each cell, said composition comprising a hardened homogeneous mixture of low density closed cell expanded synthetic resin beads and a slurry prepared from calcined gypsum and water, and facing material on the outside surface of each layer, the walls having notches in the opposite edges defining openings between each cell and adjacent the opposite faces predetermining the penetration of



the layers into the cells to extend into each cell just beyond the notches thereby closing the openings and trapping air in the cells to limit the penetration of the edges into the layers, controlling the thickness of the layers between the facing material and the opposite core faces and providing additional thermal and sound insulation, the layers further including reinforcing fibers which extend between adjacent cells and through the notches thereby to provide strengthening ties with the portions of the layers in adjacent cells and between adjacent cells.

4,076,881

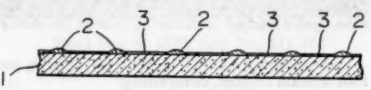
INTERLINING STRUCTURE FOR APPAREL AND METHOD FOR ITS PRODUCTION

Koichi Sato, Tokyo, Japan, assignor to Sanyo Shokai Ltd., Tokyo, Japan

Filed Sep. 2, 1975, Ser. No. 609,730

Int. Cl.[2] B05D *1/36, 5/10;* **B32B** *3/16*

U.S. Cl. 428—195 **5 Claims**



1. An apparel interlining structure comprising:

an interlining base;

a plurality of raised areas of hot-melt sealant synthetic resin applied to one surface of said interlining base; and

a water-repellent synthetic resin entirely, except for at least a part of the surfaces of the sealant-applied areas, impregnating said interlining base, said water-repellant synthetic resin having a poor co-meltability with said hot-melt sealant synthetic resin.

4. Waterproof wearing apparel comprising:

a waterproofed fabric, and

an interlining structure at least partially hot-melt sealed to said water-proofed fabric, said interlining structure comprised of:

an interlining base,

a plurality of raised areas of hot-melt sealant synthetic resin applied to one surface of said interlining base, and

a water-repellant composition resin entirely, except for at least a part of the surfaces of the sealant-applied areas, impregnating said interling base, said water-repellant composition resin having a poor co-meltability with said hot-melt sealant synthetic resin.

5. A process for preparing an apparel interlining structure, which comprises applying a hot-melt sealant synthetic resin partly to one surface of an interlining base for apparel to form a plurality of areas to which the hot-melt sealant resin has been adhered, and applying a solution of a water-repellent composi-

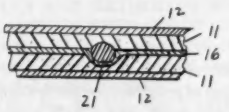
tion resin having poor co-meltability with the above sealant synthetic resin to that surface of the base which is opposite to the sealant-applied surface thereby to impregnate the base entirely, except for at least a part of the surfaces of the sealant-applied areas, with the water-repellent synthetic resin areas.

4,076,882

SHARPS DISPOSAL PADS

Larry A. Fenster, 301 Birch Drive, Roslyn, N.Y. 11576, and Leo Fenster, 20100 W. Country Club Drive, N. Miami Beach, Fla. 33180

Filed Dec. 30, 1976, Ser. No. 755,951
Int. Cl.² B32B *7/02, 3/26*
U.S. Cl. 428—215 **4 Claims**



1. In a foldable sharps disposal pad comprising a layer of elastomeric polyurethane foam on a layer of cardboard, said polyurethane carrying a pressure sensitive adhesive layer covered by a release sheet, the improvement wherein said pressure sensitive adhesive layer comprises a substantially impermeable polymer film carrying a pressure sensitive rubber base adhesive on both sides of the film.

4,076,883

FLAME-SPRAYABLE FLEXIBLE WIRES

Ferdinand J. Dittrich, Massapequa, and John D. Weir, Huntington, both of N.Y., assignors to Metco, Inc., Westbury, N.Y.

Filed Jul. 30, 1975, Ser. No. 600,741
Int. Cl.² B05D *7/00, 3/08, 1/08*
U.S. Cl. 428—242 **26 Claims**

1. A flexible wire for use in a flame spraying process comprising a mineral powder having a particle size of less than about 140 mesh held together by about 5 to 75% by volume of the wire of a cross-linked polyurethane or epoxy polymer.

4,076,884

FIBRE REINFORCING COMPOSITES

Victor Riley; Ian Macnab; John Timusk, all of Toronto, Canada, and Edward English, Downey, Calif., assignors to The Governing Council of the University of Toronto, Toronto, Canada

Division of Ser. No. 343,863, Mar. 22, 1973, Pat. No. 3,903,879. This application Jun. 11, 1975, Ser. No. 586,140
Claims priority, application United Kingdom, Mar. 22, 1972, 13333/72
Int. Cl.² D03D *15/00*
U.S. Cl. 428—255 **5 Claims**

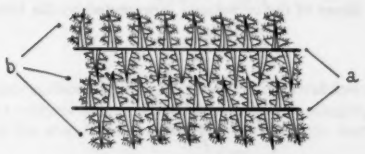
1. A fibre reinforced gypsum composite comprising gypsum matrix material having embedded therein a woven tape, said woven tape comprising an interweave of absorbent fibres with reinforcing glass fibres, said reinforcing glass fibres being glass yarn coated with a thermoplastic organic polymer, said polymer being selected from the group consisting of polyethylene, polyvinyl chloride, polypropylene, nylon and polystyrene.

4,076,885

WATER PROOFING AGENT

Maurice Brossel, Rueil-Malmaison; Gilbert Laurent, and Daniel Bertannier, both of Neuf-Brisach, all of France, assignors to Holzstoff. S.A., Basel, Switzerland; Viafrance S.A., Paris and Societe Nationale Elf Aquitaine (Production) - SNEA(P), Courbevoie, both of, France

Filed Oct. 16, 1975, Ser. No. 623,003
Claims priority, application Switzerland, Oct. 16, 1974, 13874/74
Int. Cl.² B32B *27/00*
U.S. Cl. 428—286 **9 Claims**



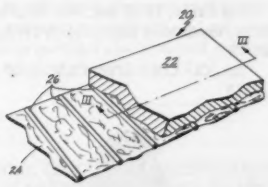
1. In a waterproofing agent comprising a combination of a non-woven fabric and a bituminous material the improvement which resides in employing as the non woven fabric material, material obtained from continuous filaments of isostatic polypropylene and as the bituminous material a mixture of elemental sulphur and bitumen of sufficient fluidity at a temperature in the range 120° to 160° C to permit dispersion of sulphur therein.

4,076,886

STRUCTURAL LAMINATE FOR SEATING

Jack C. Corcoran, Grand Rapids, Mich., assignor to Sackner Products, Inc., Grand Rapids, Mich.

Filed Jun. 14, 1976, Ser. No. 695,939
Int. Cl.² B32B *5/02, 5/22;* **D04H** *1/04*
U.S. Cl. 428—294 **16 Claims**



1. A structural laminate useful in making upholstered seats, furniture, and the like comprising:

a sheet of cushioning material;

a plurality of spaced, bendable, yet relatively stiff and resilient, elongated, self-adherent, organic polymer strips which become adhesive at elevated temperatures and are bonded to one surface of said sheet;

a relatively thin, relatively closed sheet of nonwoven covering material selected from the group comprising spunbonded polyester, polyethylene, polypropylene, fiberglass cloth and dense, calendered fabric, said covering material applied over said spaced, self-adherent strips and said one surface of said cushioning material such that said strips are intermediate said cushioning material and covering sheet;

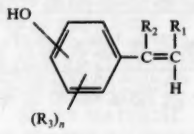
said strips being bonded along their lengths to said sheet of cushioning material and to said sheet of covering material without the use of additional adhesive material such that said covering and cushioning sheets are adhered together only by said spaced strips.

4,076,887
RECORDING SHEETS

Nobuo Tsuji; Sadao Ishige; Akio Miyamoto, and Hajime Kato, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Oct. 28, 1976, Ser. No. 736,669
Claims priority, application Japan, Oct. 28, 1975, 50-130079
Int. Cl.[2] B41M 5/12; B41C 1/06
U.S. Cl. 428—307 9 Claims

1. A pressure-sensitive recording sheet comprising a support having a developer layer on the support, said developer layer being capable of developing color images on reacting with a color former, wherein the developer layer contains as a developer a dimer of the compound represented by the formula:

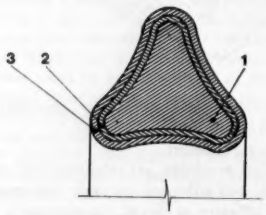


wherein R_1, R_2, and R_3 each represents a hydrogen atom, an alkyl group, an aryl group, or an aralkyl group, and n is 1 to 4.

4,076,888
PROCESS FOR THE PREPARATION OF METALLIC AND/OR METAL-CERAMIC AND/OR CERAMIC SPONGES

Giancarlo Perugini, Merano (Bolzano), and Enzo Marcaccioli, Perugia, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Jul. 6, 1976, Ser. No. 702,934
Claims priority, application Italy, Jul. 9, 1975, 25214/75; Jul. 9, 1975, 25215/75
Int. Cl.[2] C08J 9/36; C03C 7/00
U.S. Cl. 428—313 6 Claims

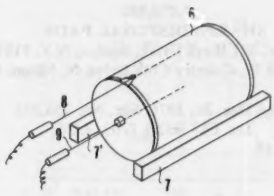


1. A process for the production of metallic and/or metal-ceramic and/or ceramic sponges having a three-dimensional cellular structure of filiform morphology, starting from a foamed polyurethane sponge having a three-dimensional cellular structure of filiform morphology, and previously metallized, said process comprising coating a metallized polyurethane sponge, having a number of pores not exceeding 30 pores/inch and a thickness not exceeding 25 mm, with at least one layer of at least one coating material selected from the class consisting of metal, metal-ceramic and ceramic materials, using a dry high-temperature coating technique consisting essentially of molten-spray deposition by a plasma spray.

4,076,889
HEAT-INSULATION MATERIAL

Tohru Sasaki; Syuuzi Terasaki, and Takao Ichii, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 14, 1975, Ser. No. 622,412
Claims priority, application Japan, Nov. 21, 1974, 49-133196
Int. Cl.[2] B32B 15/08
U.S. Cl. 428—333 10 Claims



1. A heat-insulation laminate comprising:

a. a layer of a film of polyfluoroolefin or fluoroolefin copolymer having not more than a 50% transmission ratio of visible ray and not less than a 30% transmission ratio of infrared ray, said film of polyfluoroolefin or fluoroolefin copolymer containing from 0.5 to 50 parts by weight, based on 100 parts by weight of said polyfluoroolefin or fluoroolefin copolymer, of a filler selected from the group consisting of titanium dioxide, zinc oxide, aluminum oxide, calcium carbonate, gypsum, magnesium oxide and calcium sulfite; and

b. a layer of metal on one surface of said film, said metal layer having a thickness of from 30 A to several microns.

4,076,890
MAGNETIC RECORDING MEDIUM

Yasuyuki Yamada; Goro Akashi, and Hiroshi Ogawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 4, 1973, Ser. No. 403,351
Claims priority, application Japan, Oct. 5, 1972, 47-100083
Int. Cl.[2] H01F 10/02
U.S. Cl. 428—337 8 Claims

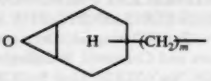
1. A magnetic recording medium comprising a flexible support with a thickness of about 5 to 50 μ and having thereon a magnetizable recording layer containing an inorganic ferromagnetic powder and from 0.1 to 25% by weight of solid inorganic and organic powders, based on 100% by weight of said ferromagnetic powder and said inorganic powders present in said magnetizable recording layer having been processed with a silane coupling agent present in an amount of about 0.5 to about 5% by weight based on the weight of said ferromagnetic powder and said inorganic powder, said silane coupling agent reacting to form chemical bonds between organic and inorganic substances in said magnetizable layer, wherein said silane coupling agent has the following general formula:

$$(A)_q\text{-}\,Si\,(R_1)_n(R_2)_{3-n}$$

wherein R_1 and R_2 each represents a hydrogen atom, a halogen atom, $-OR_3$, $-OCOR_3$ or $-R_3$; A represents a hydrogen atom, a halogen atom, $-R_3$, ClR'_3-, $CH_2{=}CH-$, $HS-(CH_2)_m$, $NH_2-(CH_2)_m$, $NH_2-(CH_2)_mNH-(CH_2)_m$, $CH_2{=}CCH_3COO-(CH_2)_m$,

$$CH_2{=}CHCOO\text{-}(CH_2)_m\text{-},\quad CH_2\text{-}\underset{\diagdown\ \diagup}{\overset{\ }{\underset{O}{\ }}}\text{-}CHCH_2O\text{-}(CH_2)_m\text{-},$$

-continued



or a phenyl group; R_3 represents a monovalent alkyl group having from 1 to 5 carbon atoms; R'_3 is the divalent moiety of said R_3; n represents number of from 0 to 3; m represents a number of 2 or 3; and q represents a number of 0 to 1, with said R_1 and R_2 not being simultaneously a hydrogen atom; such that one terminal of said silane coupling agent is bonded to a halogen atom or a methoxy group and the other terminal of said silane coupling agent is bonded to a group reactive with said organic substances.

4,076,891

PRODUCT AND METHOD OF MOLDING PLASTIC-RUBBER COMPOSITES

James Frank Yardley, Shenston, near Lichfield, and Allen Frederick Nightingale, Birmingham, both of England, assignors to Dunlop Limited, London, England

Continuation of Ser. No. 303,050, Nov. 2, 1972, abandoned. This application Feb. 14, 1975, Ser. No. 550,001

Claims priority, application United Kingdom, Nov. 18, 1971, 53556/71; Sep. 20, 1972, 43525/72

Int. Cl.[2] B32B *25/08;* **B29H** *9/00*

U.S. Cl. 428—517 **6 Claims**

1. A method of producing a molded plastic-rubber composite comprising

injection or transfer molding a substantially linear crystalline low pressure solution olefin polymer with a melt index or minimum flow rate of not less than 0.25 when measured according to the test conditions specified in ASTM D 1238-65T selected from the group consisting of polypropylene, high density polyethylene, copolymers of ethylene and propylene; copolymers of ethylene, propylene, and a minor amount of at least one other olefin monomer; copolymers of ethylene and a minor amount of at least one other olefin monomer other than propylene, and copolymers of propylene and a minor amount of at least one other olefin other than ethylene

so that it is brought, in a molten state, into contact with a prevulcanized rubber composition, containing from 5 to 70 percent by volume of a prevulcanized rubbery olefin polymer selected from the group consisting of ethylene/propylene copolymers containing from 20 to 85 mole percent of units derived from ethylene and ethylene/alpha-olefin/polyene terpolymers containing from 20 to 85 mole percent of units derived from ethylene and from 0.1 to 10 mole percent of units derived from said polyene, the remainder of the composition being comprised of ingredients normally used in compounding rubbery olefin polymers.

2. An injection or transfer-molded composite made by the method of claim 1.

4,076,892

TREATMENT OF PARTICULATE CARBON

Jack Fennimore, Welwyn; Gary Ruder, Harlow Essex, and Donald Simmonite, Hertford, all of England, assignors to T. J. Smith & Nephew Limited, Hull, England

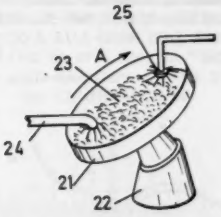
Filed Jul. 24, 1974, Ser. No. 491,293

Claims priority, application United Kingdom, Jul. 26, 1973, 35676/73; Jul. 26, 1973, 35677/73

Int. Cl.[2] A61K *9/30, 9/32;* **B01D** *39/20*

U.S. Cl. 428—407 **3 Claims**

1. A particulate absorbtive material comprising absorbtive carbon granules, said granules being coated at their surface only with a protective permeable layer of a polymer which is compatible with blood selected from the group consisting of poly (hydroxyethylmethacrylate), cellulose acetate, polyurethane, silicone, and polyamide, said layer being formed by spray coating, said layer being from about 1 to 10 microns in thickness and present in an amount of up to about 20% by weight of the total material, and said layer having a smooth



permeable surface and hindering mechanical breakdown of the particles without impregnation and consequent plugging of the pores of the absorbtive granules by the polymeric layer.

4,076,893

TRIBO MODIFIED CARRIER MATERIALS VIA ACYLATION

Harry W. Gibson, Penfield; Frank C. Bailey, Webster, both of N.Y., and Joseph L. Mincer, Lewisville, Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 26, 1974, Ser. No. 500,772

Int. Cl.[2] B32B *27/14;* **G03G** *9/10*

U.S. Cl. 428—407 **6 Claims**

1. An electrostatographic carrier composition for use in developing electrostatic latent images on a recording surface, said carrier composition comprising carrier particles having an average particle diameter between about 50 microns and about 1,000 microns, each of said carrier particles comprising a core surrounded by from about 0.1 percent to about 10.0 percent by weight based on the weight of said carrier particles of an outer coating of a polymer selected from the group consisting of styrene-alkylmethacrylate and styrene-alkylacrylate containing pendant hydroxyl and amino moieties, said polymer having been exposed to systematic chemical modification of the pendant hydroxyl and amino moieties of said polymer by acylation to provide carrier particles characterized as having controlled triboelectric charging properties.

4,076,894

ELECTRICAL CIRCUIT ELEMENT COMPRISING THICK FILM RESISTOR BONDED TO CONDUCTOR

Robert C. Langley, Millington, and Muriel Abrash, Paterson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Iselin, N.J.

Division of Ser. No. 521,937, Nov. 7, 1974, Pat. No. 3,951,672, which is a continuation of Ser. No. 301,102, Oct. 26, 1972, abandoned. This application Oct. 28, 1975, Ser. No. 626,136

Int. Cl.[2] B32B *17/06*

U.S. Cl. 428—428 **4 Claims**

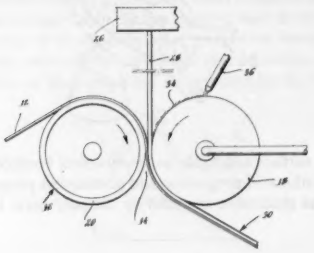
1. An electrical circuit element comprising a thick film resistor comprising preformed glass frit, wherein the glass frit is produced by heating a finely-divided mixture of glass-forming proportions of lead oxide and silica, and a minor amount of a member selected from the group consisting of ruthenium dioxide and iridium dioxide to a temperature sufficient to form a glass melt containing lead ruthenate or lead iridate, whereat the viscosity of the melt is sufficiently high to maintain the lead ruthenate or lead iridate in relatively uniform dispersion in the glass melt, cooling and comminuting the mixture to provide the glass frit, said resistor being bonded to a conductor comprising glass frit and a sufficient amount of an electrically-conductive component to provide the desired electrical properties.

4,076,895

TRANSPARENT MULTI-LAYERED FILM AND PROCESSES THEREFOR

Mark Henry Theno, Anoka, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed May 5, 1976, Ser. No. 683,253
Int. Cl.[2] B05B *5/00;* B05D *3/12, 3/00;* B32B *27/08*
U.S. Cl. 428—516 9 Claims



1. Process for imparting transparency to a multi-layered polymeric film comprising passing a continuous polymeric web into the nip formed by a pair of counter-rotating rolls, one of said rolls being a pressure roll and the other, a chill roll having a matte surface; extruding a molten polymeric film into the nip between said polymeric web and said chill roll to form a multi-layered film, while maintaining an inert liquid film on at least that portion of the chill roll which contacts said extruded film.

4,076,896

PAPER CONTAINING RAPID CURING MELAMINE-FORMALDEHYDE RESIN COMPOSITION

Kenneth Dana Bunkowski, Cincinnati, Ohio, assignor to Formica Corporation, Cincinnati, Ohio

Continuation of Ser. No. 697,083, Jun. 16, 1976, abandoned, which is a continuation of Ser. No. 600,012, Jul. 29, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,445
Int. Cl.[2] B32B *27/42;* C08G *12/32*
U.S. Cl. 428—530 12 Claims

1. Paper of at least about 60% α-cellulose content having a basis weight of from about 50 to about 90 pounds per 3000 square foot ream, a pH of from about 6.25 to about 7.25, a Gurley porosity of from about 15 to about 25 seconds per 100 c.c. of air and, impregnated therein, from about 55% to about 65%, by weight, based on the weight of the paper, of a β-staged resin composition comprising

a. the resinous reaction product of melamine, formaldehyde and from about 0.07 to about 0.16%, by weight, of diethylethanolamine, having a ratio of formaldehyde to melamine of from about 1.7 to about 1.9 to 1, respectively,

b. at least about 1.0%, by weight, of ortho- or para- or mixtures of ortho- and para-toluene sulfonamide,

c. from about 1.0% to about 5%, by weight, of ethyleneglycol phenyl ether

d. from about 40% to about 45%, by weight, of water, the remainder being melamine-formaldehyde resin, all percentages being based on the total weight of the composition, and

e. a curing catalyst.

4,076,897

LOW LAG LUMINESCENT PHOSPHORS AND X-RAY SCREEN CONTAINING THE SAME

James Ray Joiner, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 637,953, Dec. 5, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 777,320
Int. Cl.[2] C09K *11/46*
U.S. Cl. 428—539 3 Claims

1. A luminescent phosphor of the formula $Ba_{1-(x+y)}Eu_xSr_yFQ$ wherein

Q = *Br, Cl,* or *I*

x = 0.0001 to 0.2, and

y = 0 to 0.8

and wherein the crystal structure of the phosphor contains potassium or rubidium ions in an amount sufficient to reduce lag.

4,076,898

Nb OR Ta COATED WITH FIRED Zr-Mo FOR METAL-CERAMIC SEALS

Charles I. McVey, Shaker Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,148
Int. Cl.[2] B22F *7/04*
U.S. Cl. 428—553 4 Claims

1. A strongly adherent surface layer on a substrate of niobium or tantalum, said surface layer consisting of a powder mixture of zirconium and from about 2 to 50 atom percent of molybdenum fired in a non-oxidizing atmosphere at a temperature above 1520° C but not above the minimum liquidus temperature of zirconium and molybdenum with the substrate.

4,076,899

ELECTROCHEMICAL GAS ELECTRODE

Elbert Victor Kring, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

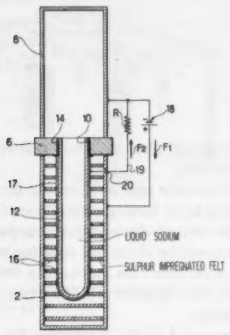
Filed May 3, 1973, Ser. No. 356,911
Int. Cl.[2] H01M *4/86*
U.S. Cl. 429—42 4 Claims

1. Improved electrochemical nitric oxide gas detection or gas separation cell comprising an anode, a cathode which is separated from the anode by an electrolyte, a cathode depolarizer and means for electrically connecting the anode and cathode, said anode being an improved electrochemical gas electrode consisting essentially of a cohesive, gas-permeable conductive mass having a thin, gas-permeable hydrophobic film bonded to its gas-contacting surface, the conductive mass consisting essentially of 8–75 weight % of silicon and 25–92 weight % of one or more metals selected from vanadium, chrominum, molybdenum, tungsten, manganese, iron, cobalt and nickel, said depolarizer selected so as to provide a voltage difference between the anode and the cathode during cell operation that is sufficient to produce a measurable current response when nitric oxide gas is oxidized at the anode, said depolarizer being an electrolyte-soluble reducible permanganate or dichromate salt of an element of Group IA or Group IIA of the Periodic Chart of the Elements or a ceric salt, in contact with the cathode, and said electrolyte being an acid electrolyte.

4,076,900
SODIUM-SULPHUR TYPE ELECTRIC CELL

Alain Le Méhauté, Gif sur Yvette, and Philippe Bordet, Sartrouville, both of France, assignors to Compagnie Generale d'Electricite S.A., Paris Cedex, France

Filed Nov. 4, 1976, Ser. No. 738,983
Claims priority, application France, Nov. 20, 1975, 75 35470
Int. Cl.[2] H01M 12/00
U.S. Cl. 429—49 3 Claims



1. In combination an electric cell of the sodium-sulphur type, and a charging circuit, said electric cell comprising:

a cathode tank containing a cathode reagent which is liquid at operation temperature and is a material selected from the group consisting of sulphur, phosphorus, selenium and the alkaline salts of these substances,

at least one solid electrolyte tube closed at its bottom end, containing an anode reagent which is liquid at operation temperature, constituted by an alkaline metal, said tube being disposed in said cathode tank so as to be immersed in said cathode reagent with the walls of the tube being made of beta alkaline alumina;

an insulating ceramic support for holding said electrolyte tube in said cathode tank, a glass part forming the connection between the support and the tube;

an anode tank containing a supply of said anode reagent and being disposed above said cathode tank so that said electrolyte tube opens at its top into said anode tank, said insulating support comprising a plate separating the open ends of said anode tank and of said cathode tank, said cathode tank being fitted with washers made of graphite felt ensuring cathode collection of the generated current, and

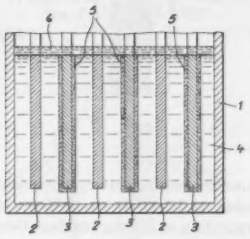
said charging circuit for said cell including a charging current source having positive and negative terminals and means for connecting said negative terminal to said anode tank and said positive terminal to said cathode tank for cell recharging, the improvement wherein:

said electrolyte tube is surrounded by a sleeve or grid which is electronically conductive, said grid being positioned between said electrolyte tube and said graphite felt washers and being connected to the negative terminal of the recharging current source through a resistor.

4,076,901
HIGH-TEMPERATURE METHOD OF OPERATING A LEAD-ACID CELL

Heinz Peter Fritz, Garching near Munich; Jürgen Besenhardt, Neu-Sass, and Gerhard Rauschenbach, Essen, all of Germany, assignors to Rheinisch-Westfalisches Elektrizitatswerk AG, Essen, Germany

Filed Oct. 19, 1976, Ser. No. 733,702
Claims priority, application Germany, Oct. 20, 1975, 2546972
Int. Cl.[2] H01M 10/44
U.S. Cl. 429—50 10 Claims



1. In a method of operating a lead-acid cell comprising a housing, at least one positive electrode having a lead dioxide active mass in the charged state of the positive electrode and disposed within said housing, a negative electrode consisting predominantly of lead disposed in said housing, and a sulfuric acid electrolyte in said housing in contact with said electrodes, the improvement which comprises:

enveloping said negative electrode in a sheath of a material inert to said electrolyte but permeably thereby and capable of retaining particles of the negative electrode, said sheath being selected from the group which consists of a woven fabric or nonwoven mat of glass fiber, a woven fabric or nonwoven mat of perhalogenated polyolefin, a woven fabric or nonwoven mat of unsubstituted polyolefin, or a ceramic material;

cycling said cell through alternate charge and discharge periods with at least the discharging thereof being effected at a temperature above 55° C; and

maintaining a layer of a vaporization-resistant low-volatility material having a specific gravity less than that of said electrolyte and insoluble therein above the electrolyte in said housing.

7. A lead-acid storage cell comprising:

a housing forming a receptacle;

a sulfuric acid electrolyte in said receptacle;

at least one positive electrode immersed in said electrolyte and having as an active mass lead dioxide in a charged state of said positive electrode;

a negative electrode in said electrolyte juxtaposed with said positive electrode and having in a charged state of said negative electrode an active mass consisting predominantly of lead;

a sheath of a material permeable to said electrolyte but substantially impenetrable to particles of said negative electrode, said sheath enveloping said negative electrode, said sheath being selected from the group which consists of a woven fabric or nonwoven mat of glass fiber, a woven fabric or nonwoven mat of perhalogenated polyolefin, a woven fabric or nonwoven mat of unsubstituted polyolefin, or a ceramic material;

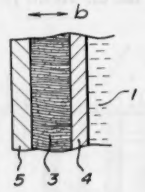
a layer of low-volatility material overlying said electrolyte in said receptacle and

means for automatically operating said cell at least during the discharge thereof at a temperature between substantially 65° and 75° C.

4,076,902
SODIUM-SULFUR STORAGE BATTERY

Keizi Senoo, Takatsuki, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Oct. 15, 1976, Ser. No. 732,770
Claims priority, application Japan, Nov. 11, 1975, 50-134681
Int. Cl.[2] H01M *10/39*
U.S. Cl. 429—104 3 Claims

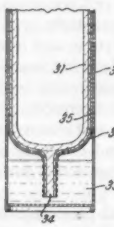


1. A sodium-sulfur storage battery comprising
a sealed housing, said housing containing a solid electrolyte tube incorporating an anodic reactant therein,
a cathodic current collector extending in a direction generally parallel to said solid electrolyte tube,
cathodic electro-conductive material made of graphite felt including a fiber content the individual fibers of which have a direction normal to the direction of said cathodic current collector and being impregnated with a cathodic reactant, said graphite felt being disposed between and in contact with said solid electrolyte tube and cathodic current collector with no space remaining except for spaces between fibers in graphite felt,
and the weight ratio of the graphite felt to the cathodic reactant is restricted to a range of from 4 to 20%.

4,076,903
ALKALI METAL-SULPHUR CELLS

James L. Sudworth, and John M. Bird, both of Burton-on-Trent, England, assignors to British Railways Board, London, England

Filed Jul. 22, 1976, Ser. No. 707,579
Claims priority, application United Kingdom, Aug. 16, 1975, 32818/75
Int. Cl.[2] H01M *10/00*
U.S. Cl. 429—104 10 Claims

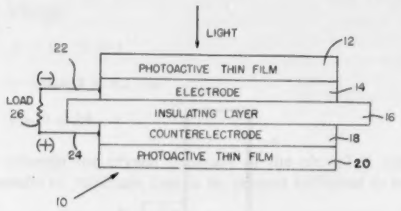


1. An alkali metal-sulphur cell comprising an outer tubular casing, an inner tubular solid electrolyte dividing the cell into anode and cathode compartments and whose interior provides one of said compartments of the cell, the inner tubular solid electrolyte being spaced from the outer casing to define an annular space, providing the other of said compartments, a primary porous coating provided on at least one surface of said solid electrolyte and an outer layer on said primary porous coating, said outer layer being more dense than said primary porous coating.

4,076,904
SOLID STATE PHOTOGALVANIC DEVICE UTILIZING SEA WATER AS AN ELECTROLYTE

Schoen-nan Chen, North Brunswick, N.J., assignor to Optel Corporation, Princeton, N.J. and Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 11, 1976, Ser. No. 740,873
Int. Cl.[2] H01M *6/30*
U.S. Cl. 429—111 6 Claims

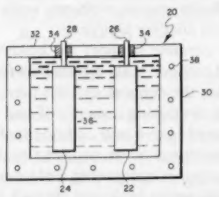


1. An unenclosed photogalvanic cell comprising:
a first electrode;
a second electrode spaced from the first;
an insulating layer having opposite surfaces upon which the first and second electrodes are deposited, the insulating layer preventing electrical shorting of the electrodes;
a photoactive thin film outwardly deposited on the first electrode and capable of converting light energy to electrical energy;
means connected to the electrodes for transferring current from the cell as current becomes available;
the photoactive thin film adapted to be in contact with a surrounding fluid electrolyte when the cell is immersed therein thus creating a photoactive interface between the photoactive thin film and the electrolyte which enables conversion of light to electrical energy when light impinges upon the photoactive thin film.

4,076,905
ELECTRODE FOR ELECTRICAL ENERGY STORAGE DEVICE

Anthony F. Sammells, Newbury Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 5, 1977, Ser. No. 793,815
Int. Cl.[2] H01M *6/36*
U.S. Cl. 429—112 12 Claims



1. An electrical energy storage device having positive and negative electrodes spaced from one another and in contact with a lithium-containing electrolyte, wherein the negative electrode is a composite electrode structure which comprises an alloy of lithium, silicon, and boron having the empirical formula Li_xSiB_y, where x has a value from 1 to 5 and y has a value from 0.1 to 3, and wherein a current-collecting matrix supporting said alloy is in intimate contact therewith.

7. A composite negative lithium electrode structure for an electrical energy storage device wherein said composite electrode structure comprises:
an alloy of lithium, silicon, and boron having the empirical

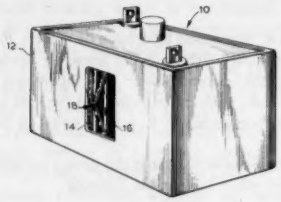
formula Li_xSiB_y, where x has a value from 1 to 5 and y has a value from 0.1 to 3, and

a current-collecting matrix supporting said alloy and in intimate contact therewith.

4,076,906
APPARATUS FOR INDICATING BATTERY CELL CONDITION

Henry E. Jensen, Lafayette Hill, Pa., assignor to Eltra Corporation, Toledo, Ohio

Filed Jun. 29, 1977, Ser. No. 811,004
Int. Cl.² H01M 2/00
U.S. Cl. 429—90 **6 Claims**



1. A cell condition indicator for battery cells having a plurality of cell plates, comprising:

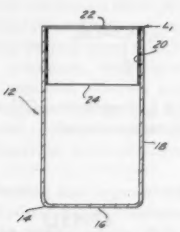
a cell container, and

indicator means visible through said container responsive to a change in plate size.

4,076,907
PAPER-LINED DRY CELL BATTERIES WITHOUT SMEARS

Anton H. Oswald, and John Peters, both of Wayne, N.J., assignors to Bright Star Industries, Inc., Clifton, N.J.

Filed Aug. 12, 1976, Ser. No. 713,668
Int. Cl.² H01M 2/18
U.S. Cl. 429—133 **9 Claims**



1. In a paper lined dry cell battery comprising:

(A) a first terminal comprising a receptacle having a base and a sidewall extending upwardly therefrom to a given height;

(B) a second terminal disposed within said receptacle but spaced therefrom;

(C) an ion-permeable liner disposed within said receptacle between said second terminal and said receptacle and extending upwardly to a second height less than said given height; and

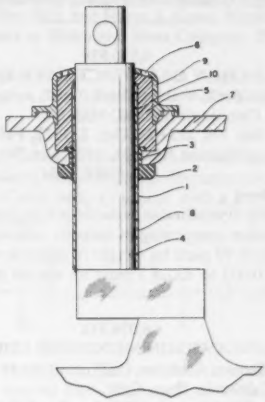
(D) a mass of depolarizer mix including an electrolyte disposed between said second terminal and said liner and extending upwardly to a third height less than said second height;

the improvement comprising a band formed substantially of electrically insulating material and disposed over the full circumference of the inner surface of said receptacle sidewall substantially from a first point below the level of the upper end of said liner to a second point substantially thereabove, thereby to electrically insulate a segment of said receptacle sidewall, said band being a separate entity and from said liner unattached thereto and secured to said inner surface of said receptacle sidewall.

4,076,908
POLE BOLT SEAL FOR STORAGE BATTERIES

Karl-Heinrich Bäcker, Eneppetal, and Hermann Schlachta, Hagen, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed Jul. 8, 1976, Ser. No. 703,542
Claims priority, application Germany, Aug. 12, 1975, 2535871
Int. Cl.² H01M 2/06
U.S. Cl. 429—184 **6 Claims**



1. In a lead storage battery having pole bolts protruding through apertures in the battery cover, the improvement comprising;

a section of shrink tubing shrunk onto the pole bolt shaft,

a hollow cap slipped over the shaft and having its bottom edge resting on the upper edge of the cover aperture,

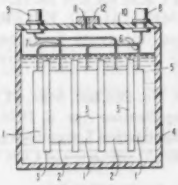
a cast body filling the space between the inner wall of the cap and the shrink tubing, and

a sealing ring between the shrink tubing and the inner edge of the cover aperture.

4,076,909
ALKALINE LEAD BATTERY

Olle B. Lindstrom, Taby, Sweden, assignor to AB Olle Lindstrom, Taby, Sweden

Continuation of Ser. No. 616,662, Sep. 25, 1975, abandoned. This application Jan. 17, 1977, Ser. No. 759,834
Int. Cl.² H01M 6/04
U.S. Cl. 429—207 **7 Claims**



1. An electric storage battery comprising at least one electrochemical cell having a positive electrode, a negative electrode, and an electrolyte comprising an alkaline-reacting aqueous solution containing an alkaline hydroxide in sufficient amount to impart an alkaline reaction during the complete

electrochemical cycle and a salt whose anion forms a difficultly soluble compound with the positive electrode material at least in its discharged condition, the active material of said negative electrode in its charged condition being a member of the group consisting of iron, cadmium, magnesium, indium, and zinc, the active material of said positive electrode in its charged condition comprising lead dioxide or a difficultly soluble tetravalent lead compound formed by the reaction of lead dioxide and the anion in the electrolyte, the active material of said positive electrode in its discharged condition comprising a difficultly soluble divalent lead compound formed by reaction of the electrode material with the anion in said electrolyte, said salt being present in an amount sufficient to prevent the active material of the positive electrode in its charged and discharged condition from going into solution.

4,076,910

NUCLEATION OF ISOTACTIC POLYSTYRENE

Henry Nelson Beck, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 293,823, Oct. 2, 1972, Pat. No. 3,817,966. This application Mar. 21, 1974, Ser. No. 453,465

Int. Cl.[2] C08K *5/34*

U.S. Cl. 526—6 **3 Claims**

1. A readily crystallizable isotactic polystyrene composition, the composition comprising in intimate admixture from about 99.995 to about 95 parts by weight of isotactic polystyrene and from about 0.005 to about 5 parts by weight of melamine.

4,076,911

ETHYLENE-CARBON MONOXIDE COPOLYMERS

Donald M. Fenton, Anaheim, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Nov. 5, 1975, Ser. No. 628,643

The portion of the term of this patent subsequent to Sep. 22, 1987, has been disclaimed.

Int. Cl.[2] C08F *4/26*

U.S. Cl. 526—11.1 **11 Claims**

1. The process of producing a high melting point, thermoplastic telomer of ethylene and carbon monoxide having a number of repeating monomeric units within the range of 2 to about 30, which process comprises reacting ethylene and carbon monoxide in a liquid medium containing an alkanoic acid having from 2 to about 6 carbons and bearing at least one halo group on an alpha carbon under reaction conditions including a temperature of about 50° to about 205° C. and a pressure of about 1 to about 200 atmospheres, in the presence of palladium cyanide, the initial ratio of ethylene to carbon monoxide being about 1/5 to about 5/1, sufficient to produce said high melting point, thermoplastic telomer.

4,076,912

TETRAPOLYMERS COMPRISING (A) UNSATURATED ACIDS (B) VINYL ESTERS (C) BRANCHED ALLYL OR METHALLYL ESTERS AND (D) VINYL ETHER OR VINYL FATTY ESTER OR LINEAR ALLYL OR METHALLYL ESTERS

Christos Papantoniou, Epinay-sur-Seine, and Jean-Claude Grognet, Gagny, both of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 563,460, Mar. 31, 1975, Pat. No. 3,966,403. This application Apr. 6, 1976, Ser. No. 674,273

Claims priority, application Luxembourg, Apr. 1, 1974, 69759

Int. Cl.[2] C08F *20/04, 220/00;* C08C *19/00, 19/22*

U.S. Cl. 526—16 **13 Claims**

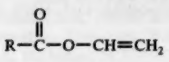
1. Copolymer of

(a) an unsaturated acid having the formula

$$R-CH=CH-(CH_2-O-CH_2)_n-COOH$$

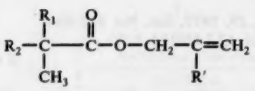
wherein $n = 0$ or 1, and when $n = 0$, R = CH_3 and when $n = 1$, R = H,

(b) a vinyl ester having the formula



wherein R is $-CH_3$ or C_2H_5,

(c) at least one branched allyl or methallyl ester having the formula



wherein R′ represents hydrogen or $-CH_3$, R_1 represents a saturated hydrocarbon chain, linear or branched, having 1–6 carbon atoms and R_2 represents $-CH_3$ or $-CH(CH_3)_2$, with the proviso that the sum of the number of the carbon atoms in R_1+R_2 is equal to or less than 7, and

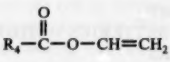
(d) a monomer selected from the group consisting of

(i) a vinyl ether having the formula

$$CH_2=CH-O-R_3$$

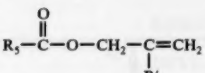
wherein R_3 is linear or branched alkyl having 1–12 carbon atoms,

(ii) a vinyl ester having a fatty chain and having the formula



wherein R_4 is linear alkyl having 7–11 carbon atoms, and

(iii) a linear allyl or methallyl ester having the formula



wherein R′ is hydrogen or $-CH_3$ and R_5 is linear alkyl having 1–11 carbon atoms.

4,076,913

SOLID OR GEL POLYMERS CONTAINING A PLURALITY OF FREE HYDRAZONE GROUPS

Derek Walker, Windermere, and Philip Howard Chapman, Ulverston, both of England, assignor to Glaxo Laboratories Limited, United Kingdom

Continuation of Ser. No. 597,675, June 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 493,051, Jul. 30, 1974, Pat. No. 4,038,469. This application Sep. 27, 1976, Ser. No. 726,784

Claims priority, application United Kingdom, Jul. 31, 1973, 36384/73

Int. Cl.[2] C08F *236/00, 210/00;* C08C *19/12;* C08G *2/00*

U.S. Cl. 526—19 **8 Claims**

1. A solid or gel polymer which is insoluble in dilute aqueous acid and possesses a plurality of hydrazone groups, >C=N—NH_2, wherein each hydrazone group either forms part of the polymer backbone chain or forms part of a side-chain attached to the polymer backbone chain in which case one of the valencies of each hydrazone group is linked to the polymer backbone chain and the other valency is bonded to an organic substituting group.

4,076,914

TREATMENT OF COUPLED POLYMERS PRIOR TO HYDROGENATION

George A. Moczygemba, and Henry L. Hsieh, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 8, 1976, Ser. No. 694,121
Int. Cl.[2] C08F 8/04
U.S. Cl. 526—25 31 Claims

1. The process of hydrogenation of an organopolyhalide-coupled rubbery conjugated diene polymer which comprises:

treating said organopolyhalide-coupled rubbery conjugated diene polymer as a solution in a hydrocarbon diluent with an effective minor treating amount of an organometal treating agent under treating conditions, wherein said organometal treating agent is represented by R_aH_bM wherein M is selected from the group consiting of lithium, sodium, potassium, magnesium, calcium, zinc, and aluminum, R is a hydrocarbyl radical of 1 to 12 carbon atoms, a is an integer of 1 to 3, and b is 0 or an integer 1 or 2, depending on the valence of M, and

thereafter hydrogenating the resulting treated polymer to substantially reduce at least the olefinic unsaturation thereof employing a hydrogenation catalyst and effective hydrogenation conditions, wherein said minor effective amount is sufficient to result in reduced olefinic unsaturation of said coupled conjugated diene polymer after said hydrogenation.

4,076,915

TREATMENT OF COUPLED POLYMERS PRIOR TO HYDROGENATION

William J. Trepka, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jun. 8, 1976, Ser. No. 694,123
Int. Cl.[2] C08F 8/04
U.S. Cl. 526—25 26 Claims

1. The process of hydrogenation of a silicon-coupled or germanium-coupled conjugated diene polymer which comprises:

treating said coupled conjugated diene polymer as said solution in hydrocarbon diluent with a minor effective amount of an organometal treating agent which is hydrocarbonlithium, -sodium, -potassium, -magnesium, -calcium, -zinc, or -aluminum compound, wherein said minor effective amount of said organometal treating agent is effective to reduce the residual olefinic unsaturation of said coupled polymer on subsequent hydrogenation of said coupled polymer, and

thereafter hydrogenating said organometal-treated coupled polymer under hydrogenation conditions to substantially reduce at least the olefinic unsaturation,

wherein said organometal treating agent is represented by R_aH_bM wherein b is 0 for all metals except aluminum, and is 0, 1, 2, or 3 where M is aluminum, and $a + b$ = valence of M.

4,076,916

FLUORINATED FUNCTIONALIZED POLYMERS

Richard J. Lagow, Manchester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 3, 1975, Ser. No. 627,999
Int. Cl.[2] C08F 8/22
U.S. Cl. 526—43 9 Claims

1. A process for producing a fluorinated polymer having functionalized pendant groups thereon, comprising:

a. placing a polymer having a hydrocarbon backbone and having pendant ester, carboxylic acid, acid halide or acid anhydride groups into an enclosed fluorination reactor maintained at a temperature below the decomposition point of said polymer;

b. flowing a mixture of fluorine gas and an inert gas through said reactor, said mixture having a low initial concentration of fluorine gas;

c. increasing the concentration of fluorine gas in said mixture on a gradual basis until a high concentration of fluorine gas is reached; and,

d. maintaining the flow of said mixture having a high concentration of fluorine gas through said reactor until said polymer is substantially fluorinated.

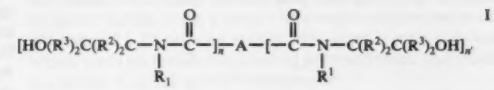
4,076,917

METHOD FOR CURING POLYMERS CONTAINING ONE OR MORE CARBOXY OR ANHYDRIDE FUNCTIONS AND COMPOSITIONS

Graham Swift, Blue Bell, and Harry J. Cenci, Warminster, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 454,645, Mar. 25, 1974. This application May 13, 1976, Ser. No. 686,004
Int. Cl.[2] C08F 8/30
U.S. Cl. 526—49 24 Claims

1. A method of curing polymers which comprises (1) mixing a polymer containing carboxy groups or carboxylic anhydride groups or salts of said carboxy groups with a β-hydroxyalkyl amide of the formula:



I

wherein A is a bond, hydrogen, a monovalent or polyvalent organic radical derived from a saturated or unsaturated alkyl containing from 1 to 60 carbon atoms, aryl, tri-lower alkyleneamino or an ethylenically unsaturated radical; R^1 is hydrogen, lower alkyl having 1 to 5 carbon atoms, or hydroxyalkyl having from 1 to 5 carbon atoms; R^2 and R^3 are the same or different radicals selected from hydrogen, straight or branched chain lower alkyl having from 1 to 5 carbon atoms, or one of the R^2 and one of the R^3 radicals joined together with the carbon atoms to which they are attached to form cycloalkyl; n is an integer of 1 or 2 and n' is an integer of 0 to 2; n being 2 when n' is 0; and (2) heating the mixture at a temperature of from about 125° to about 400° C. until a cured polymer is obtained.

4,076,918

CELLULOSE THIOCYANATE AND PROCESS FOR PREPARING THE SAME

Shaul Gladstone, Arden, and Clifton R. Neumoyer, Newark, both of Del., assignors to Argus Chemical Corporation, Brooklyn, N.Y.

Filed Feb. 12, 1975, Ser. No. 549,420
Int. Cl.[2] C08B 3/00
U.S. Cl. 536—59 5 Claims

1. Cellulose thiocyanate having from 0.015 to 1 SCN group per anhydroglucose unit of the cellulose and no other esterifying groups, and having the following characteristics:

Carbon content	38.00 – 44.40%
Nitrogen content	0.10 – 6.30%
Sulfur content	0.23 – 14.50%
Flammability	Self-extinguishing
Solubility	Insoluble in cold water, sparingly soluble in hot water; insoluble in aromatic solvents, aliphatic solvents, alcohols, and heterocyclic solvents.

4,076,919

MANUFACTURE OF ETHYLENE POLYMERS IN A TWO-ZONE TUBULAR REACTOR AT PRESSURE ABOVE 500 BARS

Friedrich Urban, Limburgerhof; Oskar Buechner, Dudenhofen; Ulrich Hartig, Neckargemuend, and Hans Gropper, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Nov. 15, 1976, Ser. No. 741,939
Claims priority, application Germany, Dec. 20, 1975, 2557653
Int. Cl.[2] C08F *4/28, 10/02*
U.S. Cl. 526—64 5 Claims

1. A process for the manufacture of an ethylene polymer by homopolymerization of ethylene or copolymerization of ethylene with a copolymerizable comonomer, in a continuously operated tubular polymerization system at a pressure of from 500 to 5,000 bars and at a temperature of from 50° to 450° C, in the presence of a polymerization initiator which generates free radicals, by feeding a mixture of ethylene, oxygen and regulator, with or without comonomer, into the polymerization system at its inlet and at the same time at a second point downstream from the inlet along the polymerization system where the reaction temperature reaches a maximum, wherein a coinitiator which has a half-life temperature, measured in benzene, of above 140° C is additionally fed in exclusively at the second feed point.

4,076,920

PROCESS FOR PRODUCING HOMO- OR COPOLYMERIZATION OF VINYL OR VINYLIDENE HALIDES HAVING REDUCED POLYMER BUILD-UP IN THE REACTOR

Bela Kalman Mikofalvy, Sheffield Lake, and Thomas Joseph Doyle, Lorain, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 737,951, Nov. 2, 1976, abandoned, which is a continuation of Ser. No. 592,183, July 1, 1975, abandoned. This application Apr. 29, 1977, Ser. No. 792,361
Int. Cl.[2] C08F *2/00, 14/06;* C08L *91/00*
U.S. Cl. 526—74 14 Claims

1. A process for producing polymers of vinyl and vinylidene halides and copolymers thereof with each other or either with one or more vinylidene monomers having at least one terminal $CH_2{=}C<$ grouping comprising forming a monomer premix containing the monomer or monomers to be polymerized, the aqueous reaction medium, from about 0.01% to about 0.5% by weight of a free radical yielding catalyst based on the weight of 100 parts of monomer or monomers being polymerized, said catalyst being free of alkali metals, an ammonium salt of a saturated fatty acid containing from 8 to 20 carbon atoms, and at least one long straight chain saturated alcohol containing from 14 to 24 carbon atoms, and wherein the ratio of alcohol to fatty acid is greater than 1.0, homogenizing said premix at a temperature below the reactivity of the catalyst or catalysts employed, passing said homogenized premix to a reaction zone, emulsion polymerizing said homogenized premix in said zone at a temperature in the range of about 30° C. to about 70° C., maintaining the pH in the reaction zone in the range of 7.0 to about 12.0 until the reaction is complete, and thereafter recovering the polymer or copolymer, whereby polymer build-up in said reaction zone is substantially reduced.

4,076,921

METHOD OF PRODUCING GLYCOL METHACRYLATE OR GLYCOL ACRYLATE POLYMERS AND COPOLYMERS

Miroslav Stol; Vladimir Stoy, and Zdenek Tuzar, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Oct. 13, 1972, Ser. No. 297,390
Claims priority, application Czechoslovakia, Oct. 14, 1971, 7234-71
The portion of the term of this patent subsequent to Oct. 26, 1993, has been disclaimed.
Int. Cl.[2] C08F *220/20*
U.S. Cl. 526—89 10 Claims

1. The method of producing hydrophilic polymer products comprising a mixture of both soluble and insoluble components which comprises forming a starting monomer mixture consisting essentially of (1) a major portion of monoesters of methacrylic and/or acrylic acids and polyvalent alcohols selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, 1,2-propylene glycol, 1,4-butylene glycol, glycerol, pentaerythritol, mannitol and sorbitol, and (2) a minor amount of a crosslinking agent selected from the group consisting of di- and triesters of methacrylic and/or acrylic acid and polyvalent alcohols selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, 1,2-propylene glycol, 1,4-butylene glycol, glycerol, pentaerythritol, mannitol and sorbitol; combining said starting monomer mixture with (3) a member selected from the group consisting of monocyclic and bicyclic aromatic and partly hydrogenated monocyclic and bicyclic aromatic hydrocarbons, halogenated aliphatic and cycloaliphatic hydrocarbons, esters of carboxylic acids and aliphatic and aromatic alcohols, ethers, cycloethers, ketones and cycloketones, said last mentioned group member being capable of unlimitedly dissolving all of the monomer components but being a nonsolvent and/or swelling agent for the polymer product, said monomer being present in an amount of less than 66% by weight of the total polymerization mixture including said last mentioned group member; polymerizing said monomer mixture under conditions of free radical polymerization to form a polymeric product which is in part soluble and in part insoluble in a member selected from the group consisting of lower aliphatic alcohols, dimethylformamide, glycol methacrylate and glycol acrylate; and effecting the combination of the monomer mixture with the group (3) member during such polymerization in small quantities under controlled stirring at a rate at which the polymeric product formed separates out of the polymerization solution and at which the concentration of the crosslinking agent is maintained within the critical range of 0.02 to 0.2% by volume based on the total volume of the polymerization mixture.

4,076,922

METHOD FOR PRODUCING ETHYLENE POLYMERS

Akihiro Satoh, Kimitsugun; Akio Takahashi; Jun Masuda, both of Ichiharashi; Masato Harada, Chibashi, and Sadahiko Yamada, Ichiharashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Aug. 2, 1976, Ser. No. 711,022
Claims priority, application Japan, Aug. 8, 1975, 50-96427
Int. Cl.[2] C08F *4/02, 10/02*
U.S. Cl. 526—97 18 Claims

1. In the method for producing ethylene polymers by homopolymerization of ethylene or copolymerization of ethylene with a small amount of another α-olefin or a diolefin in the presence of a catalyst obtained by combining a solid product having on its surface, atoms of a transition metal of Group IVA or VA of the Periodic Table, with an organoaluminum compound,

an improvement which comprises using as said solid product, (III) a solid product obtained by reacting (A) $AlCl_3$ or $FeCl_3$ with (B) a divalent metal hydroxide, oxide or car-

bonate or a double salt containing these compounds or a hydrate of divalent metal compound; reacting the resulting reaction product with (D) a compound of a transition metal of Group IVA or VA of the Periodic Table in the form of liquid; reacting (I) the resulting solid product with an aluminum trialkoxide or boron trialkoxide; and reacting (II) the resulting solid product again with (D') a compound of a transition metal of Group IVA or VA of the Periodic Table, same as or different from said (D), in the form of liquid.

4,076,923

PROCESS FOR PREPARING POLYOLEFINS

Kazuo Matsuura, Kawasaki; Masaomi Matsuzaki, Yokohama; Fumiaki Oshimi, Kawasaki; Nobuyuki Kuroda, Yokohama, and Mituji Miyoshi, Kanagawa, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

Filed Mar. 22, 1976, Ser. No. 669,299

Claims priority, application Japan, Apr. 3, 1975, 50-39745

Int. Cl.[2] C08F *4/02, 10/02*

U.S. Cl. 526—97 **8 Claims**

1. A process for preparing polyolefins which comprises polymerizing or copolymerizing olefins using as catalyst a component comprising a solid carrier and a titanium compound and/or a vanadium compound supported thereon, and an organometallic compound of a metal of Groups I to IV of the Periodic Table, said solid carrier containing 0.5 to 20% by weight of sulfur and being prepared by mixing and heating aluminum oxide and ammonium sulfate at a temperature of from 50° to 1,000° C.

4,076,924

PROCESS FOR POLYMERIZATION OR COPOLYMERIZING OLEFINS CONTAINING AT LEAST 3 CARBON ATOMS

Akinori Toyota, Iwakuni; Kiyoshi Odawara, Waki, and Norio Kashiwa, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,278

Claims priority, application Japan, Sep. 3, 1974, 49-100553; Jun. 25, 1975, 50-77555

Int. Cl.[2] C08F *4/02, 10/06*

U.S. Cl. 526—125 **25 Claims**

1. A process for preparing a highly crystalline olefin polymer or copolymer, which comprises polymerizing or copolymerizing an olefin containing at least 3 carbon atoms in the presence of a catalyst comprising

(a) a solid titanium catalyst component obtained by reacting a solid magnesium component (1) with a liquid or solid titanium compound (2) of the formula

$$Ti(OR^1)_lX_{4-l}$$

wherein X is a halogen atom, R^1 is an alkyl group containing 1 to 8 carbon atoms and l is an integer of 0 to 4,

in the absence of a free organometallic compound of a metal of Groups I to III of the periodic table, the reaction between the solid magnesium component (1) and titanium compound (2) being carried out in the suspended state by suspending the solid magnesium component in the liquid titanium compound or in a solution of the liquid or solid titanium compound in an inert solvent and separating the solid component of the resulting reaction product, said solid magnesium component being obtained by separating a solid from a suspension of a reaction product derived from (i) a magnesium dihalide, (ii) an alcohol, (iii) an organic acid ester selected from the group consisting of primary alkyl esters of aliphatic monocarboxylic acids, alkyl esters of alicyclic carboxylic acids and primary alkyl esters of aromatic monocarboxylic acids and (iv) an organometallic compound of a metal of Groups I to III of the periodic table, and

(b) an organometallic compound of a metal Groups I to III of the periodic table.

4,076,925

STABILIZING CROSSLINKABLE COPOLYMERS COMPRISING ACRYLONITRILE, N-METHYLOL ALKYL ETHER OF UNSATURATED CARBOXYLIC ACID AMIDE WITH (A) AMIDE (B) LACTAM OR (C) UREA COMPOUNDS

Theo Neukam; Ulrich Reinehr, both of Dormagen; Francis Bentz, Cologne, and Günther Nischk, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Dec. 16, 1976, Ser. No. 751,364

Claims priority, application Germany, Dec. 19, 1975, 2557502

Int. Cl.[2] C08F *2/00, 2/16, 20/70*

U.S. Cl. 526—204 **7 Claims**

1. A process for the production of a crosslinkable copolymer of acrylonitrile, prepared from 88 parts by weight of a mixture of the following monomers

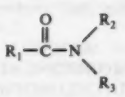
a. at least 72 parts by weight of acrylonitrile,

b. 0.1–12 parts by weight of N-methylol alkyl ether of an ethylenically α,β-unsaturated carboxylic acid amide, and

c. 0.5–4 parts by weight of at least one other comonomer;

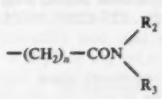
the process comprising polymerizing said mixture in an acidic aqueous medium in the presence of a redox catalyst and in the presence of 2–12 parts by weight of a water-soluble stabilizer which prevents crosslinking during polymerization and which is selected from the group consisting of

a. a carboxylic acid amide of the formula



in which

R_1 is hydrogen, C_1–C_6-alkyl, aryl, or

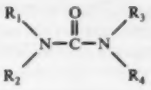


wherein

R_2 and R_3 are hydrogen, methyl, or ethyl; and

n is an integer from 1 to 3;

b. a urea of the formula



in which

R_1 to R_4, are hydrogen, C_1–C_3-alkyl; or

c. a lactam of the formula

in which

R_1 is C_3–C_6-alkylene and

R_2 is hydrogen or C_1–C_3-alkyl;

and recovering said crosslinkable copolymer.

4,076,926

POLYMERIZATION CATALYST COMPRISING ALUMINUM HALIDE AND AN ALCOHOL OR ETHER

David Lee Milner, and Ian Stanley Ripley, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 10, 1976, Ser. No. 684,953

Claims priority, application United Kingdom, May 14, 1975, 20379/75

Int. Cl.[2] C08F *4/06, 10/14, 32/00, 36/02*

U.S. Cl. 526—209 6 Claims

1. A process for the polymerisation of an unsaturated organic compound or mixture of unsaturated organic compounds selected from the group consisting of cyclic or acyclic mono- or di-olefines containing 4 to 20 carbon atoms, styrene or a styrene homologue, a mixture of coumarone and indene, or an aromatic fraction of petroleum origin containing 9 to 12 carbon atoms which comprises:

contacting the compound or compounds at a temperature in the range −100° to +200°C with 0.1 to 5 weight percent based on the compound or compounds to be polymerised of a catalyst comprising aluminium chloride, aluminium bromide or aluminium iodide, a hydrogen halide, and an alcohol selected from the group consisting of an alkanol containing up to 30 carbon atoms, a polyalkylene glycol, benzyl alcohol and a ring substitute benzyl alcohol or a saturated aliphatic ether containing 7 to 40 carbon atoms in the molecule, said alcohol or ether being used in an amount which corresponds from 0.1 to 1.0 mole per mole of aluminium halide selected from the group consisting of aluminium chloride, aluminium bromide and aluminium iodide.

4,076,927

PROCESS FOR PRODUCING SULFUR MODIFIED POLYCHLOROPRENE

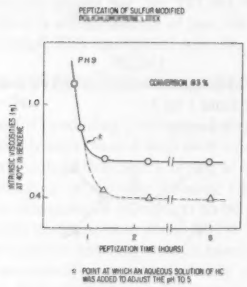
Akihiko Shimizu, and Atsushi Kita, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Japan

Filed Aug. 5, 1975, Ser. No. 601,997

Claims priority, application Japan, Aug. 6, 1974, 49-89497

Int. Cl.[2] C08F *36/18*

U.S. Cl. 526—217 1 Claim



1. A process for producing sulfur modified polychloroprene polymers which comprises polymerizing at 10-50° C chloroprene and a comonomer in an acidic emulsion using a cationic emulsifier of alkylallylbenzyl trimethyl ammonium chloride in the presence of 0.25 to 10.0 wt. % of sulfur relative to the amount of monomer and a peroxide initiator, and then performing a peptization of the resulting sulfur modified polychloroprene latex by addition thereto of an alkaline aqueous solution to produce an alkaline pH greater than 8, which peptization is terminated by addition of an acidic solution to produce a neutral or acid pH.

4,076,928

SUBSTANTIALLY DRY WATER SWELLABLE PARTICULATE POLYELECTROLYTE

James R. Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 494,439, Aug. 5, 1974. This application Aug. 20, 1975, Ser. No. 606,147

Int. Cl.[2] C08F *220/34;* B29B *1/02*

U.S. Cl. 526—240 6 Claims

1. A substantially dry water swellable particulate polyelectrolyte produced by the method which comprises

1. preparing a solution,

I. which comprises a solvent selected from the group consisting of water, lower alcohols and mixtures thereof, and

II. about 5 to about 60% by weight based on (I) of a crosslinkable carboxylic copolymer which contains in the copolymer

A. about 25 to about 98% by weight based on the total weight of the copolymer of units derived from an alkali metal salt of an olefinically unsaturated monosulfonic or monocarboxylic acid;

B. about 2 to about 50% by weight of units derived from an olefinically unsaturated monocarboxylic acid; and

C. about 0.1 to about 5.0% by weight of units derived from an N-substituted acrylamide or methacrylamide having the formula

$$H_2C{=}CR{-}C(O){-}NHCH_2{-}O{-}R'$$

wherein R is selected from hydrogen or methyl and R′ is hydrogen or an alkyl group of 1–8 carbons,

2. spreading a coating of said solution on an impervious substrate,

3. heating said coated substrate to a temperature greater than about 30° C to crosslink said polyelectrolyte,

4. separating said crosslinked polyelectrolyte film from said substrate, and

5. disintegrating said film to form flakes, strips, or powders thereof.

4,076,929

VINYLIDENE FLUORIDE POLYMER HAVING IMPROVED MELT FLOW PROPERTIES

Julius Eugene Dohany, Berwyn, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Oct. 30, 1975, Ser. No. 627,481

Int. Cl.[2] C08F *14/22*

U.S. Cl. 526—255 8 Claims

1. A high molecular weight vinylidene fluoride polymer resin which is a homopolymer or a copolymer of at least 75 mol percent vinylidene fluoride copolymerized with at least one other monomer selected from the group consisting of halogenated ethylenes, halogenated propylenes and halogenated butylenes, said polymer having a distinct bimodal molecular weight distribution, as indicated by gel permeation chromatography, and a critical shear stress of at least 3 million dynes per square centimeter.

4,076,930

POLYSACCHARIDE POLYOLS

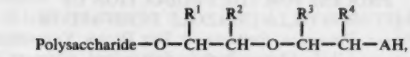
James Ellingboe, 35 Hollis St., South Weymouth, Mass.; Ernst Holger Nystrom, Skoldvagen 21, 182 64 Djursholm, and Jan Bertil Sjövall, Nybrogaten 23, 114 39 Stockholm, both of Sweden

Continuation-in-part of Ser. No. 783,736, Dec. 13, 1968, abandoned. This application Jan. 29, 1971, Ser. No. 110,931

Int. Cl.[2] C08B *11/08, 31/08, 37/00*

U.S. Cl. 536—1 4 Claims

1. A solid derivative of a polysaccharide containing more than 6 pentose or hexose groups, said derivative containing at least one radical of the formula



a. wherein said A is sulfur, and
b. said R^1 and R^2 are each hydrogen alkyl, aryl, alkylene, or alkoxyalkyl, and
c. wherein said R^3 and R^4 are each hydrogen, alkyl, aryl, alkylene, or alkoxy alkyl,
i. said R^1 and R^2 containing not more than 6 carbon atoms,
ii. said R^3 and R^4 containing not more than 28 carbon atoms.

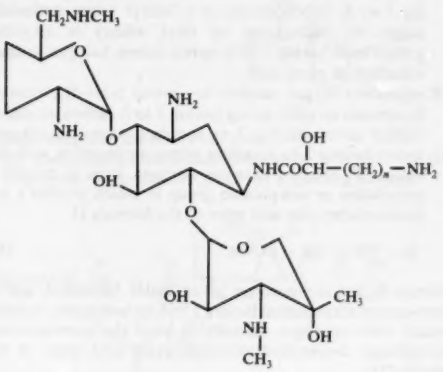
4,076,931

DERIVATIVES OF AN ANTIBIOTIC XK-62-2 AND THE PROCESS FOR THE PRODUCTION THEREOF

Shinji Tomioka, Machida, and Yasuki Mori, Kawasaki, both of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 4, 1975, Ser. No. 601,361
Claims priority, application Japan, Aug. 5, 1974, 49-88998
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 **5 Claims**

1. A composition of matter having an antibacterial activity represented by the formula:



wherein *n* is the integer 3 or 4.

4,076,932

PROCESS FOR PRODUCING REGENERATED CELLULOSIC ARTICLES

Richard Benjamin Hammer, Morris Plains; Albin Frank Turbak, Convent Station; Norman A. Portnoy, Hopatcong, all of N.J., and Arthur C. West, St. Paul, Minn., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 27, 1976, Ser. No. 662,137
Int. Cl.[2] C08B *16/00*
U.S. Cl. 536—30 **9 Claims**

1. In a process for producing a regenerated cellulosic article comprising nitrosating cellulose with a nitrosating agent selected from the group consisting of an oxide of nitrogen and nitrosyl chloride and dissolving the cellulose in a dialkylacylamide solvent and then regenerating the dissolved cellulose by contacting the dissolved cellulose with a regenerant, said process introducing substantial quantities of nitric acid into the regenerant,

the improvement in which the regenerant comprises a liquid selected from the group consisting of water and a 1 - 4 carbon atom aliphatic monohydric alcohol, and a reactive base which is soluble in the regenerant in an amount ranging from 6% to 25% by weight of the regenerant, said improvement producing a regenerated cellulosic article of improved resistance to alkaline solubility.

4,076,933

PROCESS FOR PRODUCING A REGENERATED SHAPED CELLULOSIC FIBER

Albin Frank Turbak, Convent Station; Richard Benjamin Hammer, Morris Plains; Norman A. Portnoy, Hopatcong, all of N.J., and Arthur C. West, St. Paul, Minn., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 27, 1976, Ser. No. 662,138
Int. Cl.[2] C08B *16/00*
U.S. Cl. 536—30 **12 Claims**

1. A process for producing a regenerated shaped cellulosic fiber comprising nitrosating cellulose with a nitrosating agent selected from the group consisting of an oxide of nitrogen and nitrosyl chloride and dissolving the cellulose in an aprotic solvent selected from the group consisting of a dialkylacylamide and dimethylsulfoxide and regenerating the dissolved cellulose by spinning the cellulosic solution into a regenerant, said regenerant being selected from the group consisting of butanol, pentanol and benzyl alcohol, where the solvent is a dialkylacylamide and from the group consisting of propanol, butanol and benzyl alcohol where the solvent is dimethylsulfoxide, said regenerated fiber being trilobal or quadrilobal in cross-sectional shape as a result of the use of said regenerants.

4,076,934

METHOD FOR CONTROLLING OXYGEN LEVEL DURING CONTINUOUS XANTHATION OF ALKALI CELLULOSE

Gordon D. Mills, Veedersburg, Ind., assignor to Olin Corporation, Pisgah Forest, N.C.

Filed Oct. 22, 1976, Ser. No. 734,826
Int. Cl.[2] C08B *9/04*
U.S. Cl. 536—60 **1 Claim**

1. A continuous process for xanthating and dissolving alkali cellulose in a single chamber under an atmosphere containing less than 3% oxygen comprising continuously feeding crumbs of alkali cellulose into a closed reaction chamber where it is continuously contacted with carbon disulfide, continuously diffusing nitrogen upwardly into said alkali cellulose as it enters said chamber to displace any air entrained in said alkali cellulose with nitrogen prior to its entering said chamber, maintaining said alkali cellulose free of ambient air after diffusing nitrogen therethrough, holding said alkali cellulose within said reaction chamber for a period of time sufficient to complete the reaction thereof with carbon disulfide and convert said alkali cellulose to cellulose xanthate, dissolving said cellulose xanthate within said chamber in an aqueous solution, and continuously removing said dissolved cellulose xanthate from said reaction chamber while maintaining the atmosphere in said chamber at less than 3% oxygen solely by said continuous purging of the alkali cellulose with nitrogen as it is fed into said chamber.

4,076,935

GRINDING METHOD FOR CELLULOSE

Franz Eichenseer, Wiesbaden-Biebrich; Dieter Steidl, Hofheim-Diedenbergen, and Walter Müller, Kelkheim-Hornau, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 12, 1975, Ser. No. 640,171
Int. Cl.[2] B27J *7/00;* **B27L** *11/00;* **C08B** *1/00, 11/20*
U.S. Cl. 536—86 **14 Claims**

1. A method of reducing the particle size of a cellulose compound, selected from the group consisting of cellulose and an ether derivative thereof, which comprises grinding the compound in a vibration mill in contact with air and with sufficient water to yield a product having a water content of from 2 to 10% by weight and wherein at least 50% of the particles in the product have a particle size of 100μ or less.

4,076,936

7β-(2-ARYL-2-HYDROXYIMINOACETAMIDO)CEPH-3-EM-4-CARBOXYLIC ACIDS CARRYING A 7α-LOWER ALKOXY SUBSTITUENT

Brian Laundon, Grange-over-Sands, England, assignor to Glaxo Laboratories Limited, Greenford, England

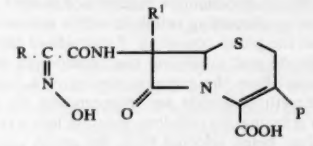
Division of Ser. No. 485,233, Jul. 1, 1974, Pat. No. 4,007,174. This application Dec. 1, 1976, Ser. No. 746,596

Claims priority, application United Kingdom, Jul. 6, 1973, 32273/73

Int. Cl.[2] C07D *501/20*; A61K *31/545*

U.S. Cl. 544—21 4 Claims

1. A compound selected from the group consisting of a compound of the formula:



wherein R is phenyl, thienyl or furyl; R^1 is C_1–C_4 alkoxy; P is a group $—CH_2Y$ wherein Y is $—OCOR^9$ or $—OCOAR^{10}$ where A is O, S or NH, R^9 is methyl and R^{10} is hydrogen or R^9; which is the syn isomer or a mixture of syn and anti isomers containing at least 75% of the syn isomer and a physiologically acceptable salt thereof.

4,076,937

DIBENZYL GLYCOLIC ACID DERIVATIVES

Wolf-Dieter Vigelius; Gerhard Satzinger, both of Denzlingen, and Manfred Herrmann, St. Peter, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 528,612, Dec. 2, 1974, abandoned. This application Jun. 16, 1976, Ser. No. 696,665

Claims priority, application Germany, Dec. 17, 1973, 2362708

Int. Cl.[2] C07D *295/10*

U.S. Cl. 544—171 19 Claims

1. An Acetyl-dibenzyl-glycolic acid-β-R-ester wherein R is selected from the group consisting of:

piperidinoethyl,
2,2,6,6-tetramethyl-piperidino-ethyl,
dimethylaminoethyl,
diethylaminoethyl,
dimethylaminopropyl,
pyrrolidinoethyl,
morpholinoethyl,
piperidino-isopropyl,
piperidinopropyl,
(2-methyl-piperidino)-ethyl,
(3-methyl-piperidino)-ethyl,
(4-methyl-piperidino)-ethyl,
(2,6-dimethylpiperidino)-ethyl,
(4-phenyl-piperidino-ethyl,
(4,4-pentamethylene-piperidino)-ethyl, and
hexamethyleneiminoethyl and pharmaceutically compatible quaternary lower alkyl ammonium salts and pharmaceutically compatible inorganic and organic acid salts thereof.

4,076,938

PROCESS FOR THE PRODUCTION OF 3-HYDROXY-1,2,4-TRIAZOLE DERIVATIVES

Beat Böhner, Binningen, Switzerland; Dag Dawes, Voyenenga, Norway, and Willy Meyer, Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

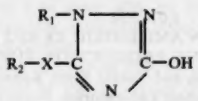
Continuation-in-part of Ser. No. 606,265, Aug. 20, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,135

Claims priority, application Switzerland, Aug. 29, 1974, 11771/74

Int. Cl.[2] C07D *249/12, 249/14, 403/04, 413/04*

U.S. Cl. 544—132 9 Claims

1. Process for the production of 3-hydroxy-1,2,4-triazole derivatives of the formula I



(I)

wherein

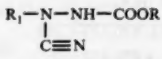
R_1 represents an alkyl group having 1 to 6 carbon atoms or a cycloalkyl group having 3 to 8 carbon atoms,

R_2 represents an alkyl group having 1 to 6 carbon atoms, a cycloalkyl group having 3 to 8 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, or a benzyl group optionally mono- to disubstituted by alkyl, alkoxy or alkylthio groups each having 1 to 4 carbon atoms, halogen, trifluoromethyl or nitro, and

X represents oxygen, sulphur or a group $>N—R_3$, wherein R_3 denotes an alkyl group having 1 to 6 carbon atoms, an alkenyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, or together with the radical R_2 and the adjacent nitrogen atom it denotes a pyrrolidino or morpholino group in which process a hydrazinecarboxylic acid ester of the formula II

$$R_1 — NH — NH — COOR \quad \text{(II)},$$

wherein R_1 has the meaning given under formula I, and R represents an alkyl radical having 1 to 4 carbon atoms, is firstly reacted with cyanogen chloride to yield the corresponding 2-substituted 2-cyanohydrazinecarboxylic acid ester of the formula III



(III)

wherein R_1 and R have the meanings given under the formulae I and II, and the resulting intermediate product is subsequently cyclised under alkaline conditions in the presence of a compound R_2XH.

4,076,939

2-(4-SUBSTITUTED-1,2,5-THIADIAZOLE-3-YLOXY)-ACETALDEHYDES

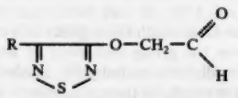
Patrice C. Belanger, Dollard des Ormeaux, Canada, assignor to Merck Sharp & Dohme (I.A.) Corporation, Rahway, N.J.

Continuation-in-part of Ser. No. 602,720, Aug. 7, 1975, abandoned. This application Feb. 8, 1977, Ser. No. 766,637

Int. Cl.[2] C07D *417/04*

U.S. Cl. 544—134 1 Claim

1. Compounds having the formula:



wherein
R is morpholino.

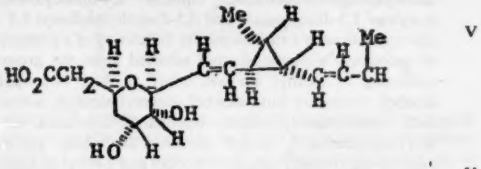
4,076,940

CONVERSION OF ACID S, PRODUCED BY THE ORGANISM *POLYANGIUM CELLULOSUM* VAR. *FULVUM* INTO ACID F

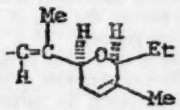
David T. Connor, Ann Arbor, Mich., and Maximilian von Strandtmann, New Castle, Del., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 5, 1977, Ser. No. 794,180
Int. Cl.[2] C09B *23/00*
U.S. Cl. 542—447 **3 Claims**

1. A process for preparing the substance acid F (V) having the following formula:



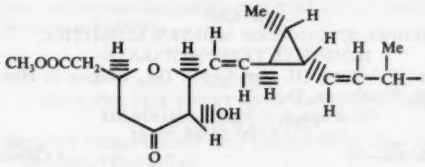
V



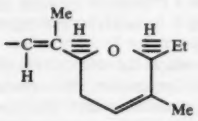
V

which comprises the following steps:

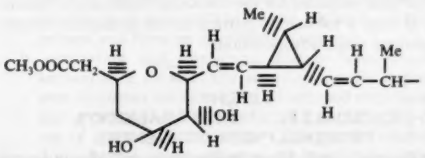
A. Reducing an alcoholic solution of keto ester S (III) wherein the keto ester S has the following formula:



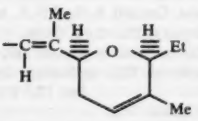
III



with an alkali metal borohydride to obtain a mixture of acid S methyl ester II and acid F methyl ester IV having the following formulas:

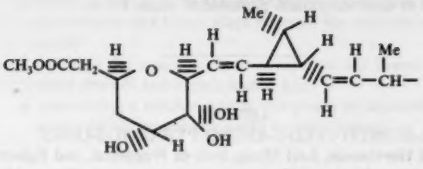


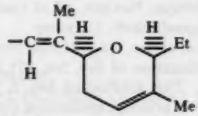
II



AND

-continued





IV

B. Separating acid S methyl ester II and acid F methyl ester IV by preparative thin layer chromatography;

C. Hydrolyzing acid F methyl ester IV to obtain the desired acid F (V).

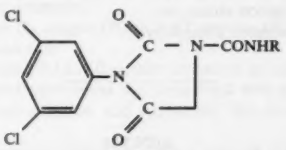
4,076,941

PROCESS FOR THE PREPARATION OF 1-CARBAMOYL-3-(3,5-DICHLOROPHENYL)-HYDANTOINS

Michel Sauli, Paris, France, assignor to Philagro, Lyon, France

Filed Dec. 15, 1976, Ser. No. 750,704
Claims priority, application France, Dec. 22, 1975, 75 39905
Int. Cl.[2] C07D *233/80*
U.S. Cl. 548—312 **13 Claims**

1. A process for the preparation of a 1-carbamoyl-3-(3,5-dichlorophenyl)-hydantoin of the formula:



in which R represents alkyl of 1 to 4 carbon atoms in a straight or branched chain or an alkenyl of 2 to 4 carbon atoms, wherein an isocyanate of the formula:

$$R-N=C=O$$

in which R is defined as above, is reacted with 3-(3,5-dichlorophenyl)-ureidoacetic acid in an anhydrous medium in the presence of a tertiary amine capable of increasing the rate of reaction, said isocyanate being present in an amount of from 2.9 to 4 mols per mol of said ureidoacetic acid.

4,076,942

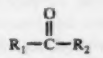
CRYSTALLINE DIPILOCARPINIUM PAMOATE

Robert L. Smith, Lansdale, and Ta-Jyh Lee, Hatfield, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 1, 1975, Ser. No. 618,538
Int. Cl.[2] C07D *405/06*
U.S. Cl. 548—336 **4 Claims**

1. Substantially crystalline, optically pure dipilocarpinium pamoate.

3. A dipilocarpinium pamoate ketone solvate wherein the ketone moiety is:



wherein R_1 and R_2 are independently selected from alkyl

groups of from 1 to 3 carbon atoms, having a molar ratio of ketone to dipilocarpinium pamoate of about 1:1.

4,076,943

1-SUBSTITUTED-3-AMINO-PYRAZOL-5-ONES

Harald Horstmann; Karl Meng, both of Wuppertal, and Egbert Wehinger, Neviges, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

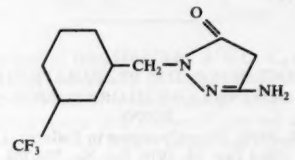
Division of Ser. No. 521,906, Nov. 7, 1974, abandoned, which is a continuation of Ser. No. 371,959, Jun. 21, 1973, abandoned. This application Jan. 3, 1977, Ser. No. 756,179

Claims priority, application Germany, Jun. 23, 1972, 2230792; Jun. 23, 1972, 2230675

Int. Cl.[2] C07D *231/52*

U.S. Cl. 548—360 **4 Claims**

1. A compound of the formula



or a pharmaceutically acceptable non-toxic salt thereof wherein

R is

(a) naphthyl having 1 or 2 identical or different substituents selected from the group consisting of halogen and alkyl of 1 to 4 carbon atoms; or

(b) unsubstituted β-naphthyl.

4,076,944

3β,14β-DIHYDROXY-14,17-SECO-D-BISNORANDROSTAN-17-OIC ACID DERIVATIVES

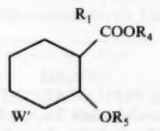
Perry Rosen, North Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 528,115, Nov. 29, 1974, Pat. No. 3,987,066, which is a division of Ser. No. 217,956, Jan. 14, 1972, Pat. No. 3,872,076. This application Jul. 2, 1976, Ser. No. 702,264

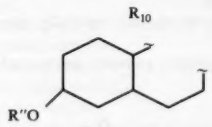
Int. Cl.[2] C07C *69/74*

U.S. Cl. 560—5 **8 Claims**

1. A compound of the formula



wherein R_1 is lower alkyl of from 1 to 5 carbon atoms, W' is



R_4 is hydrogen or lower alkyl, R_5 is hydrogen or lower alkanoyl, R'' is hydrogen, or lower alkanoyl and R_{10} is hydrogen or methyl.

4,076,945

METHOD FOR MAKING URETHANE-TERMINATED POLYCARBODIIMIDES AND PRODUCTS THEREOF

Otto C. Elmer, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 186,779, Oct. 5, 1971, abandoned. This application Feb. 24, 1977, Ser. No. 771,708

Int. Cl.[2] C07C *101/44*

U.S. Cl. 560—25 **5 Claims**

1. A urethane-terminated polycarbodiimide prepared by:

1 reacting at a temperature of no more than about 50° C. an arylene diisocyanate in which the isocyanate groups are of unequal reactivity and being selected from the group consisting of toluene 2,4-diisocyanate, 2-methyl napthalene 1,5-diisocyanate, 3-methyl-4,4'-diisocyanatodiphenylmethane, 3-chloro-4,4'-diisocyanatodiphenylmethane, 3-methoxy-4,4'-diisocyanatodiphenylmethane, 2,4-diisocyanatochlorobenzene, cumene 2,4-diisocyanate, m-xylene 2,5-diisocyanate and 3,5-dimethylbiphenyl-4,4'-diisocyanate with a stoichiometric deficiency of a primary or secondary aliphatic alcohol selected from the group consisting of methyl alcohol, ethyl alcohol, isopropyl alcohol, secondary buyl alcohol, isoamyl alcohol, n-hexanol, cyclohexanol, 2-chloro-1-propanol, 2-octanol, methylphenylcarbinol, benzyl alcohol, diethylene glycol mono-n-butyl ether, cinnamyl alcohol and 2-ethyl hexanol to convert less than all of the isocyanate groups to urethane groups;

2 cooling the mixture to near room temperature; and

3 admixing therewith a carbodiimide-forming catalyst and polymerizing the partially urethane-terminated arylene diisocyanate to a urethane-terminated polycarbodiimide that exhibits a single N=C=N peak at 2130 cm.$^{-1}$ and is free of other peaks in the 2000 to 2500 cm.$^{-1}$ band under infra-red inspection.

4,076,946

HYDROGENATION OF MOLTEN ALDEHYDIC DIMETHYL TEREPHTHALATE

William H. Millick, III, New Castle, Del., assignor to Hercofina, Wilmington, Del.

Filed Jan. 2, 1974, Ser. No. 430,102

Int. Cl.[2] C07C *67/48, 69/82*

U.S. Cl. 560—78 **5 Claims**

1. In a process for treating molten aldehydic DMT by subjecting it to catalytic hydrogenation with a catalyst that not only promotes hydrogenation of the aldehydic content, but also tends at the temperature of the molten DMT to promote ring hydrogenation, the improvement for minimizing said ring hydrogenation, which comprises dissolving in said molten aldehydic DMT a quantity of molecular hydrogen sufficient to hydrogenate at least a substantial portion of said aldehydic content without substantially enhancing the rate of formation of dimethyl hexahydroterephthalate, and contacting the resulting solution with a catalytic quantity of said catalyst for a period of time sufficient for the molecular hydrogen to hydrogenate at least a substantial portion of the aldehydic content with minimal ring hydrogenation.

4,076,947

CYCLOALKYL AND CYCLOALKENYL PROSTAGLANDIN CONGENERS

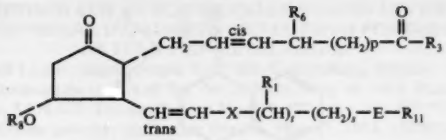
Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 457,321, Apr. 2, 1974, abandoned. This application Jan. 12, 1977, Ser. No. 758,743

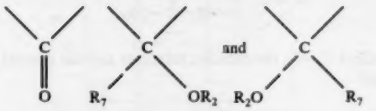
Int. Cl.[2] C07C *177/00*

U.S. Cl. 560—121 **42 Claims**

1. A compound selected from the group consisting of an optically active compound of the formula:



and a racemic compound of that formula and the mirror image thereof wherein p is an integer from 1 to 5, inclusive; R_6 is hydrogen or an alkyl group having up to four carbon atoms; R_1 is an alkyl group having up to three carbon atoms; X is a divalent radical selected from the group consisting of those of the formulae:



wherein R_2 is selected from the group consisting of hydrogen, triphenylmethyl, and mono- or di-methoxy substituted triphenylmethyl and R_7 is hydrogen or an alkyl group having up to three carbon atoms with the proviso that when R_7 is alkyl then R_2 must be hydrogen; R_3 is selected from the group consisting of hydroxy, alkoxy having up to twelve carbon atoms, tetrahydropyranyloxy and tri(lower alkyl)-silyloxy; R_8 is selected from the group consisting of hydrogen, tetrahydropyranyl and tri(lower alkyl)silyl; s is zero or an integer from 1 to 5, inclusive; t is zero or one; E is selected from the group consisting of cyclopropyl, cyclononyl and cycloalkenyl having from 5 to 9 carbon atoms; R_{11} is selected from the group consisting of hydrogen and lower alkyl; with the proviso that when E is a saturated cycloalkyl group then the sum of s and t is at least one; and the pharmaceutically acceptable cationic salts thereof when R_3 is hydroxy.

4,076,948

PROCESS FOR TREATMENT OF ADIPIC ACID MOTHER LIQUOR

Samuel S. Mims, Odessa, Tex., assignor to El Paso Products Company, Odessa, Tex.

Filed Oct. 10, 1968, Ser. No. 766,476
Int. Cl.[2] C07C *69/34, 69/44, 69/48*
U.S. Cl. 560—191 **11 Claims**

1. In a process for the treatment of the mother liquor resulting from the nitric acid oxidation of cyclohexanol and/or cyclohexanone and the recovery of valuable components therefrom, which mother liquor contains a mixture of aliphatic dibasic acids, nitric acid and metal catalyst values, the improved process which comprises:

a. contacting said mother liquor with a water-miscible lower alkyl alcohol at a temperature of from 25° C. to the boiling point of the alcohol used and in a sufficient amount to esterify at least a portion of the aliphatic dibasic acids present and form an esterifying mixture;

b. contacting said esterifying mixture with a sufficient amount of a substantially water-immiscible organic solvent to extract the esters formed into said organic solvent, said organic solvent being selected from the group consisting of aromatic hydrocarbons, halogenated aliphatic hydrocarbons, halogenated aromatic hydrocarbons and mixtures thereof;

c. continuing contact of said esterifying mixture and said organic solvent until at least a portion of the esters formed are partitioned into an organic phase comprising the esters dissolved in said organic solvent and there is formed said organic phase and an aqueous phase containing water, nitric acid, metal catalyst values, any excess alcohol and any unesterified organic acids;

d. separating said organic phase and said aqueous phase;

e. distilling said organic phase to remove the organic solvent and recover the lower alkyl esters of the aliphatic dibasic acids;

f. distilling the aqueous phase to remove any excess lower alkyl alcohol and excess water; and

g. recovering a residue which comprises an aqueous nitric acid solution containing metal catalyst values.

4,076,949

PROCESS FOR THE PREPARATION OF OXALATE ESTERS

Lee R. Zehner, Media, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 685,833, May 13, 1976, abandoned. This application May 9, 1977, Ser. No. 794,778
Int. Cl.[2] C07C *69/36*
U.S. Cl. 560—204 **34 Claims**

1. A process for the preparation of oxalate esters of an alcohol which comprises reacting a monohydric saturated aliphatic, alicyclic or aralkyl alcohol containing from 1 to 20 carbon atoms and which may contain other substituents which do not interfere with the reaction, with a mixture of carbon monoxide and oxygen at a pressure of between about 500 psig to 5000 psig and at a temperature in the range of about 40° C. to 150° C. in the presence of an effective amount of a catalytic mixture of

(a) a palladium, rhodium, platinum, copper or cadmium metal salt compound or mixtures thereof,

(b) an aliphatic, cycloaliphatic aromatic or heterocyclic amine or ammonia,

(c) a copper (I), copper (II), iron (II) or iron (III) oxidant salt compound and

(d) from about 0.1 to 40 weight percent of an ammonium or substituted ammonium salt compound with a counterion other than a halide, and recovering the desired oxalate ester.

26. A process according to claim 1 wherein the reaction is carried out in the presence of a catalytic amount of an organic mono- or poly-dentate ligand or coordination complex selected from the group consisting of alkyl, aryl and halogen substituted phosphines, arsines, stibines and halide salts.

4,076,950

PROCESS FOR MANUFACTURE OF ALKYL ESTERS OF ALIPHATIC CARBOXYLIC ACIDS

Thomas Stewart, Andalusia, and Frederick W. Landau, Havertown, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 19, 1976, Ser. No. 706,646
Int. Cl.[2] C07C *69/54*
U.S. Cl. 560—218 **5 Claims**

1. In a process for the preparation of acrylic and methacrylic acid esters by conventional esterification, wherein crude product ester is recovered as distillate from an esterification reactor together with unreacted alkanol, unreacted carboxylic acid and water of esterification by fractional distillation, the improvement of obtaining a crude ester distillate substantially free of unreacted carboxylic acid by adding to the reactor sufficient substantially anhydrous product ester, thereby satisfying combined ester/alkanol and ester/water azeotropes so that substantially all of the unreacted carboxylic acid remains in the reactor and the combined azeotropes are distilled over as crude product.

4,076,951

METHOD OF POLYMERIZING VINYL CHLORIDE

Kazuhiko Katayama, Kobe; Masahiko Nishigaki, Nishinomiya; Akira Ohtani, Kobe; Nobutaka Tani, Kobe; Minoru Nishizawa, Kobe, and Hirokazu Nakanishi, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 3, 1976, Ser. No. 747,410
Claims priority, application Japan, Dec. 10, 1975, 50-147863
Int. Cl.[2] C08F 2/18, 2/20, 14/06
U.S. Cl. 526—62 12 Claims

1. In a method of suspension polymerizing vinyl chloride or a monomer mixture of vinyl chloride as major component and other monomers copolymerizable therewith as minor component, in an aqueous medium, in the presence of a suspension agent and an oil soluble catalyst, the improvement comprising the step of coating the interior surfaces of the polymerization vessel and auxiliary equipment prior to said polymerization with at least one compound selected from the group consisting of hydroxyhydroquinone and pyrogallol.

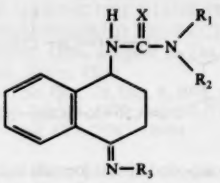
4,076,952

CERTAIN TETRAHYDRO-4-IMINO-1-NAPHTHYLUREAS

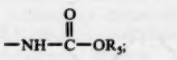
Goro Asato, Titusville, and Terence James Bentley, South Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 705,313, Jul. 14, 1976, Pat. No.4,041,070. This application Mar. 25, 1977, Ser. No. 781,233
Int. Cl.[2] C07C 101/44; A01N 9/20
U.S. Cl. 560—28 4 Claims

1. A compound of formula:



wherein X is oxygen or sulfur; R_1 is hydrogen or alkyl C_1–C_4; R_2 is hydrogen, alkyl C_1–C_4, 2-propynyl, alkoxy C_1–C_4 or benzyloxy; R_3 is the moiety



R_5 is alkyl C_1–C_4; the racemic mixtures and the optical isomers thereof.

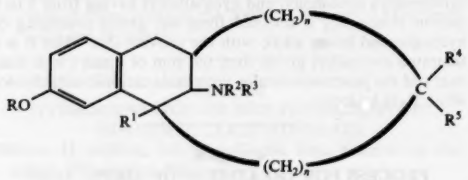
4,076,953

1,3-BRIDGED AMINO TETRALINS

Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 588,021, Mar. 13, 1975, Pat. No. 4,034,041. This application Feb. 17, 1977, Ser. No. 769,605
Int. Cl.[2] C07C 69/00, 79/46
U.S. Cl. 560—142 2 Claims

1. A compound of the formula:



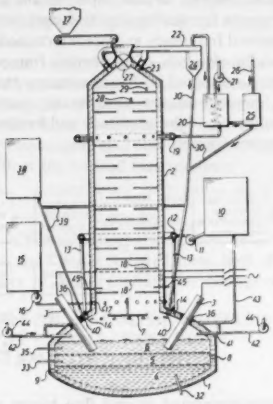
wherein R is lower alkanoyl; R^1 is lower alkyl of from 1 to 4 carbon atoms; R^2 and R^3 are independently selected from hydrogen, or lower alkyl of from 1 to 4 carbon atoms; R^4 and R^5 are independently selected from the group lower alkyl, or R^4 and R^5 may be concatenated to form a 5 or 6 membered carbocyclic ring; and n is 1 or 2 and the pharmaceutically acceptable addition salts thereof.

4,076,954

METHOD AND AN ELECTRICALLY HEATED DEVICE FOR PRODUCING MOLTEN METAL FROM POWDERS OR LUMPS OF METAL OXIDES

Rolf Linder, Skjutarevagen 7, 77 200, Grangesberg, Sweden

Continuation-in-part of Ser. No. 469,983, May 15, 1974, Pat. No. 3,976,472. This application May 28, 1976, Ser. No. 690,742
Claims priority, application Sweden, May 17, 1973, 7307022
Int. Cl.[2] H05B 7/18; C21C 5/52
U.S. Cl. 13—9 R 11 Claims



1. In a device for reducing and smelting metal oxides to a metal melt including a prereduction furnance in which powdery or lumpy metal oxide is prereduced by the introduction of a suitable reducing gas and a final reduction furnance having a heated smelting furnace for final reduction arranged to directly receive the prereduced metal oxide from the prereduction furnace for final reduction of this material with a reducing agent selected from the group comprising coal, oil, natural gas and other solid, liquid and gaseous hydrocarbon-containing materials as a reducing agent, wherein the improvement comprises the device being equipped with means for directly feeding the reducing gas evolved in the smelting furnace used for the final reduction into the lower end of the prereduction furnace, and with means for bringing said reducing gas which is fed from the smelting furnace to the prereduction furnance into contact with a cooling agent selected from the group consisting of gaseous, liquid and solid cooling agents so as to cool the reducing gas to a temperature at which sticking of the metal oxide treated in the prereduction furnace is prevented and simultaneous efficient prereduction with the reducing gas in the prereduction furnace is achieved.

4,076,955

PACKAGE FOR HERMETICALLY SEALING ELECTRONIC CIRCUITS

Louis E. Gates, Jr., Westlake Village, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

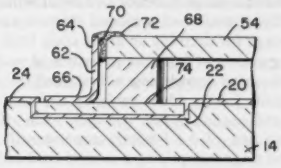
Continuation of Ser. No. 554,788, Mar. 3, 1975, abandoned. This application Feb. 10, 1977, Ser. No. 767,583
Int. Cl.[2] H05K 5/06
U.S. Cl. 174—52 FP 13 Claims

1. A hermetically sealed package for housing an electronic device, comprising:

a base for supporting the electronic device and having a sealing area on said base for describing an enclosure for completely surrounding the electronic device, electrical conductors connectable to the electronic device and extending under said sealing area for electrically coupling the electronic device into an electronic system;

means hermetically bonded to said base sealing area and extending above and completely around said base sealing area for enclosing the electronic device, said means including a lid sealing area extending substantially perpendicular to said base and facing substantially inwardly of said means;

a lid having a peripheral surface extending substantially perpendicular to said base, facing outwardly of said described enclosure and spaced from said lid sealing area for defining a gap located between said surface and said lid sealing area and extending substantially perpendicular to said base; and



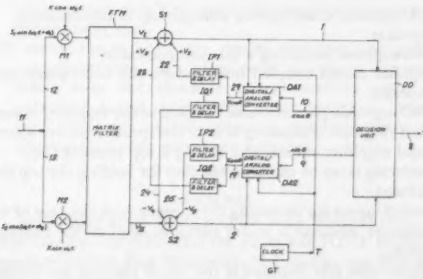
solder in the gap and hermetically bonding said lid sealing area to said lid peripheral surface, the location of the gap thereby encouraging the exertion of at least shear forces on the bonding of said solder and thereby substantially avoiding exertion of cantilever and tensile forces between said lid and said means and therefore on said solder, and for enabling removal and replacement of said lid from said means while avoiding at least thermal harm to the electronic device.

4,076,956

DECISION NETWORK FOR RECEIVER OF PSK DIGITAL SIGNALS

Renato Dogliotti, and Umberto Mazzei, both of Turin, Italy, assignors to CSELT - Centro Studi e Laboratori Telecomunicazioni, Torino, Italy

Filed Mar. 25, 1976, Ser. No. 670,534
Claims priority, application Italy, Mar. 27, 1975, 67780/75
Int. Cl.[2] H04L 15/24
U.S. Cl. 178—88 10 Claims



1. In a receiver for digital message signals transmitted via two conjugate carrier waves of like frequency identifying $4b$ different signal levels, b being an integer, in combination:

first and second demodulating means for deriving from said carrier waves a first and a second bipolar input voltage defining respective coordinates of an imaginary coordinate system divided by its coordinate axes into four quadrants, the input voltages concurrently derived by said first and second demodulating means defining a point on one of said quadrants in the vicinity of one of $4b$ predetermined locations on respective radii emanating from the origin of said coordinate system, each of said radii including with a fixed reference direction an angle representing one of said signal levels, each quadrant being divided into $b+1$ zones of possible signal deviation, each of said zones encompassing one of said predetermined locations, said zones being

identically distributed in all quadrants, said first and second demodulating means comprising a pair of coherent detectors followed by a pair of analog-digital converters for quantizing said input voltages, thereby forming binary words each including a sign bit and a multiplicity of modular bits; and

decision means connected to said first and second demodulating means for identifying the corresponding signal level in response to said input voltages, said decision means including a first stage for converting the relationship of the absolute magnitudes of said input voltages into a zone-identifying code and a second stage in cascade with said first stage for deriving an angle code from said zone-identifying code and from the polarities of said input voltages;

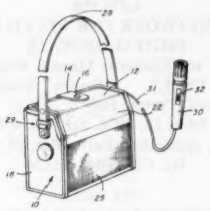
said first stage comprising a first read-only memory with first cells jointly addressable by the modular bits of said first and second input voltages, each of said first cells storing one of $b+1$ binary-zone-identifying codes, said second stage comprising a second read-only memory with second cells jointly addressable by said zone-identifying codes and by the sign bits of said first and second input voltages, each of said second cells storing one of $2b+1$ angle codes.

4,076,957

PORTABLE SOUND DEVICE FOR PUBLIC ADDRESS

Ira Molay, Wenham, Mass., assignor to Audiophonics Corporation, Beverly, Mass.

Filed Jul. 15, 1976, Ser. No. 705,474
Int. Cl.[2] H04R *3/00*
U.S. Cl. 179—1 AT **14 Claims**



1. A portable sound device comprising, in combination;

a speaker,

a microphone including a microphone cable,

amplifier means coupled intermediate the microphone and speaker,

a rechargeable power source coupled to the amplifier means,

a carrying case containing at least the speaker, power source and amplifier means, and having a top opening flap,

a securing strap on the carrying case for holding the top flap closed,

bracket means for mounting the speaker with the core of the speaker adjacent a sound pervious wall of the carrying case,

a removable box disposed at the top of the case for housing the microphone and microphone cable

and snap means on the removable box for securing the box in position in the carrying case.

4,076,958

SIGNAL SYNTHESIZER SPECTRUM CONTOUR SCALER

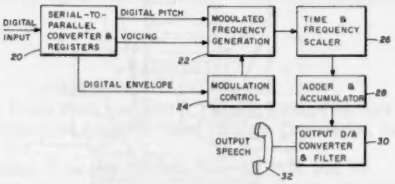
Donald P. Fulghum, Dallas, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Filed Sep. 13, 1976, Ser. No. 722,814
Int. Cl.[2] G10L *1/00*
U.S. Cl. 179—1.5 A **31 Claims**

1. A synthesizer for converting consecutive frames of digital words into analog signals, such consecutive frames including frequency and amplitude information relating to consecutive predetermined instants of time of a first signal, and one word of each frame comprising a channel containing fundamental frequency information bits relating to the fundamental frequency of the original signal at one instant of time, and other consecutive words of each frame comprising channels containing amplitude information bits of consecutive, predetermined frequency bands of the first signal, said bands having a predetermined relation to the fundamental frequency of the first signal at one instant of time, said synthesizer including:

input means for receiving consecutive frames of digital words;

first means connected to said input means and including memory means for storing digital signals indicative of the predetermined frequency and predetermined amplitude of the words in channels of sequential frames, and means operatively associated with said memory means for causing said memory means to transmit successive digital signals indicative of the amplitude and frequency of words of subsequent frames;



second means connected to said first means and including storage means of the differential of amplitude values of words at time interpolation intervals between subsequent frames, and means for receiving successive digital signals indicative of the amplitude of words of subsequent frames, and for generating from the differential of amplitude values and the received digital signals a time scaled value for one of the words of one frame for the receive digital signal; and

adder means for receiving the digital words from said second means and for producing a digital signal corresponding to each frame and indicative of the sum of the time scaled signals corresponding to the words of each frame; and

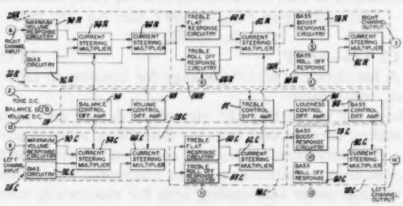
a digital-to-analog converter for receiving the output of said adder means and producing an analog signal corresponding to said first signal.

4,076,959

VOLUME, TONE AND BALANCE CONTROL FOR MULTI-CHANNEL AUDIO SYSTEMS

William F. Gilbert; Burtron D. Schertz, and Lester Wilkinson, all of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 8, 1976, Ser. No. 730,950
Int. Cl.[2] H03G *5/10, 3/10;* **H03F** *3/45*
U.S. Cl. 179—1 D **9 Claims**



1. Audio tone control apparatus providing a base tone control function comprising,

signal processing means including a bass shaping network responsive to an audio voltage signal for producing a first modulated direct current signal the amplitude of which decreases with increasing frequency of said audio signal to effect a bass boost and for providing a second modulated direct current signal the amplitude of which increases with increasing frequency of said audio signal to effect a bass cut,

current steering means for producing an output current which is a summation of complementary percentages of said first and second modulated direct current signals,

means establishing a DC control voltage related to a desired bass response,

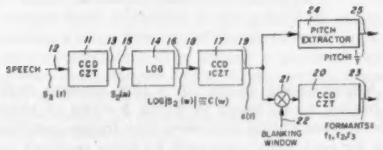
a bass response control differential amplifier providing a differential output related to said DC control voltage,

means applying the differential output of said bass response control differential amplifier to said current steering means for establishing said complementary percentages to thereby effect the desired bass response.

4,076,960
CCD SPEECH PROCESSOR

Dennis D. Buss, and Charles Robert Hewes, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 27, 1976, Ser. No. 735,916
Int. Cl.[2] G10L *1/00*
U.S. Cl. 179—1 SA **28 Claims**



1. Apparatus for performing the homomorphic deconvolution of speech comprising:

(a) First charge transfer device transform means having an input coupled to receive analog electrical signals representing speech for sampling said signals and performing thereon an analog discrete Fourier transform via the chirp Z transform algorithm to produce analog output signals $S_2(\omega)$ representing the components of said discrete Fourier transform.

(b) Circuit means coupled to receive said $S_2(\omega)$ signals from said first transform means for generating in response thereto analog output signals $C(\omega)$ comprising a non-linear function of the magnitude of said $S_2(\omega)$ signals;

(c) Second charge transfer device transform means coupled to receive said $C(\omega)$ signals from said circuit means for performing thereon an analog inverse discrete Fourier transform via the chirp Z transform algorithm to produce analog cepstrum signals $c(t)$.

4,076,961
AUTOMATIC SWITCHING UNIT FOR DATA COMMUNICATIONS NETWORK

Jerry L. Holsinger, Boston, and David E. Williams, Andover, both of Mass., assignors to Intertel, Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 508,278, Sep. 23, 1974, abandoned. This application Mar. 9, 1976, Ser. No. 665,256
Int. Cl.[2] H04M *9/00, 11/00;* **H04B** *3/00*
U.S. Cl. 179—2 DP **50 Claims**

1. An automatic switching unit for connecting an interfacing unit selectively to a primary transmission path and to a secondary transmission path, the secondary transmission path being adapted to convey a secondary path condition signal, said automatic switching unit comprising:

A. switching means having stable and astable states and including:

i. a primary switching means for connecting, in its stable state, the interfacing unit to the primary transmission path, and

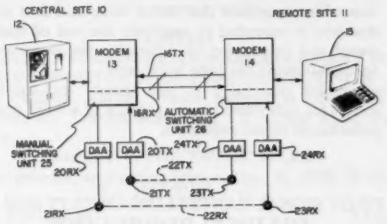
ii. a secondary switching means for connecting, in its astable state, the interfacing unit to the secondary transmission path, and

B. switch control means including:

i. means for generating a control signal that shifts said primary and secondary switching means to their astable states in response to the secondary path condition signal, and

ii. resetting means for terminating the control signal thereby to shift said primary and secondary switching means to their stable states.

33. Apparatus for controlling communications in a data communications network that includes a central site, a remote



site, and a primary communications path that normally is used during communications between the central and remote sites, said apparatus comprising:

A. switching means at the central site,

B. means at the central site for establishing communications between said switching means and an alternate communications path from the remote site that is in parallel with the primary communications path,

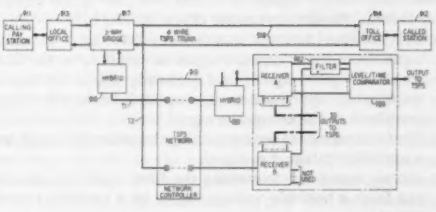
C. means at the remote site for establishing communications between the remote site and the alternate communications path in response to the establishment of communications between said switching means and the alternate communications path, and

D. means for isolating the remote site from the primary communications path after communications are established over the alternate communications path, said switching means establishing communications between the central site and the alternate communications path after said isolating means are activated.

4,076,962
METHOD AND APPARATUS FOR RECEIVING DISPARATE SEQUENCES OF SPACED TONE BURSTS

Kenneth Streisand, East Brunswick, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N. J. 07974

Filed Mar. 7, 1977, Ser. No. 774,969
Int. Cl.[2] H04M *17/00*
U.S. Cl. 179—6.3 R **14 Claims**



1. Apparatus for detecting and identifying disparate prese-

lected signal sequences of spaced tone bursts corresponding to predetermined criteria wherein portions of the sequences may be subjected to signal interference, which comprises:

detecting means for providing an output signal indicative of the occurrence of a tone burst;

first timing means for indicting when said output signal persists continuously for a first predetermined duration;

second timing means responsive to said detecting means and said first timing means for measuring the total duration of said output signal while bridging interruptions therein after the first predetermined duration and indicating if the total exceeds a first predetermined minimum duration, said second means also accumulating the total duration of said interruptions to indicate if the accumulation exceeds a second predetermined duration to reset said apparatus into an initial state before the occurrence of said first predetermined minimum duration;

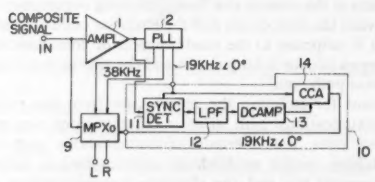
third timing means responsive to the indication of the end of said first minimum duration for measuring the total duration of interruptions that occur after said first minimum duration is exceeded to ascertain the end of said output signal and continuing to determine the duration of the space following the tone burst; and

logic means responsive to said second and third timing means for indicating the occurrence of a valid one of said preselected signal sequences.

4,076,963
PILOT SIGNAL CANCELLING CIRCUIT FOR FM MULTIPLEX DEMODULATOR

Seijiro Fujie, Tokyo, Japan; Susumu Yokoyama, deceased, late of Tokyo, Japan, and by Toshikazu Yokoyama, administrator, Onomichi, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 18, 1977, Ser. No. 788,497
Claims priority, application Japan, Apr. 19, 1976, 51-43636
Int. Cl.² H04H *5/00*
U.S. Cl. 179—15 BT **12 Claims**



1. In a pilot signal cancelling circuit for an FM multiplex demodulator, including a composite signal source, a phase lock loop for deriving a fixed amplitude 19 KHz pilot signal and 38 KHz sub-carrier switching signals from the composite signal, a multiplex demodulator for deriving right and left channel stereophonic output signals from the composite signal in response to the switching signals, said output signals containing pilot signal components, circuit means for generating pilot signal cancelling signals from the fixed amplitude pilot signal, and circuit means for combining the cancelling signals with the demodulator output signals to cancel said pilot signal components therein, the improvements characterized by:

a. synchronous detector means for producing a pulsating signal from the composite signal in response to the fixed amplitude pilot signal, said pulsating signal having an amplitude proportional to the amplitude of the pilot signal contained in the composite signal,

b. filter circuit means for converting the pulsating signal into a variable voltage d.c. signal,

c. circuit means for converting the filter circuit means output from a variable voltage signal to a variable current signal,

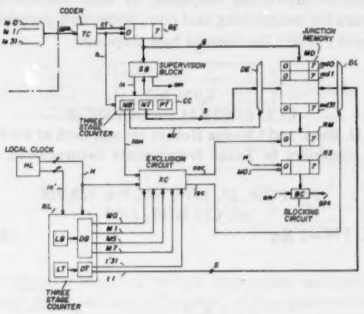
d. current controlled attenuator means for varying the magnitude of the fixed amplitude pilot signal in response to the converting circuit means output, and

e. means coupling the attenuator means output to the generating circuit means.

4,076,964
TIME DIVISION SYSTEM FOR SYNCHRONIZING FUNCTIONS CONTROLLED BY DIFFERENT CLOCKS

Michel André Robert Henrion, Boulogne, and André Lucien Coudray, Rueil-Malmaison, both of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Jul. 26, 1976, Ser. No. 708,816
Claims priority, application France, Jul. 28, 1975, 75 23460
Int. Cl.² H04J *3/06*
U.S. Cl. 179—15 BS **5 Claims**



1. A synchronizing circuit for a time division multiplex system having an exchange in which a series of plural bit words is received during successive time frames comprising a time slot for each word with each bit being received serially during a time element of a time slot and with each word being received at the clock rate of a distant office from which the series of words is transmitted, each word being forwarded within said exchange at a local clock rate of the same duration and extent as the clock rate of the distant office, said circuit including a memory for storing therein a word in parallel form in response to a storage signal based on said distant clock rate during a time element thereof, means in said exchange for sensing the occurrence of a storage signal, means responsive to a read signal during a preselected time element for reading a bit from said memory, means for comparing a check signal derived from said storage signal but longer in duration than said storage signal against said read signal for reading a word from said memory to ensure that only one word is read during a time slot, means responsive to a condition in which a check signal coincides with a read signal for shifting said read signal to a time element spaced in time a predetermined plural number of time elements from the present time interval, and means for causing reading of words at successive shifted time elements of subsequent time slots to prevent reading and storing of words at the same time.

4,076,965
UNIVERSAL RECEIVER/SENDER

Rolf Einar Olsen, and Ernst August Munter, both of Ottawa, Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 25, 1976, Ser. No. 717,618
Int. Cl.² H04Q *1/50*
U.S. Cl. 179—16 EC **4 Claims**

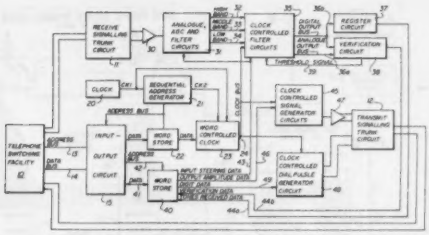
1. A universal receiver sender apparatus for use in combination with a telephone switching facility including a digital data processing unit, bus means for connecting the processing unit to the receiver sender apparatus, and a supervisory signalling trunk means having receiving and sending portions for con-

necting the receiver sender apparatus to a telephone transmission facility selected by the telephone switching facility, the receiver sender being responsive in its operation to instruction words directed thereto by the processing unit, the receiver sender apparatus comprising:

means for generating a plurality of clock signals, each appearing at a respective output thereof, each clock signal having a pulse repetition frequency directly proportional to a predetermined frequency multiplied by the value of a respective instruction word from the processor;

means for receiving signals from the receive portion of the supervisory trunk and passing only those received signals having frequencies within a passband as determined by the response of the receiving means to a control word from the processor;

a plurality of commutating filter means each having an analogue input connected to the receiving means for receiving the signals passed by the receiving means, and a



control input connected to the generating means for receiving a respective one of the plurality of clock signals, each commutating filter having a passband center frequency as determined by the pulse repetition frequency of said clock signal, each commutating filter means having a digital output for indicating that a signal within the passband has been received;

signal generating means having an analogue output connected to the sending portion of the supervisory signalling trunk, and an input connected to the generating means, said input for receiving a predetermined one of said plurality of clock signals, the signal generating means being responsive to said one clock signal to generate at said analogue output a substantially sinusoidal signal having a frequency directly proportional to the pulse repetition frequency of said one clock signal;

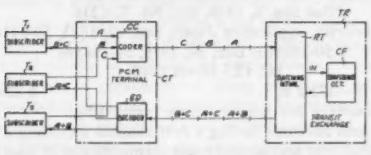
whereby the receiver sender apparatus is programmable to receive and transmit multiple frequency signalling in a plurality of different signalling formats.

4,076,966

METHOD OF AND SYSTEM FOR HANDLING CONFERENCE CALLS IN DIGITAL TELEPHONE EXCHANGE

Amilcare Bovo, Milan, and Giuseppe Valsecchi, Lecco (CO), all of Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.A., Milan, Italy

Filed Aug. 2, 1976, Ser. No. 710,636
Int. Cl.[2] H04M *3/56*
U.S. Cl. 179—18 BC **12 Claims**



1. A method of linearly superposing significant portions of logarithmically coded coincident voice samples in a conference call, each voice-sample code consisting of a polarity bit, a plurality of higher-order range bits and a plurality of lower-order quantum bits, the numerical weights of said quantum bits depending on the rank of the code as determined by said range bits, comprising the steps of:

a. separately storing a higher-ranking code and a lower-ranking code derived from a pair of coincident voice samples to be arithmetically combined;

b. downshifting the quantum bits of the lower-ranking code to less significant bit positions in which they would have their original numerical weights if prefaced by the range bits of the higher-ranking code;

c. comparing the polarity bits of the two codes stored in step (a); and

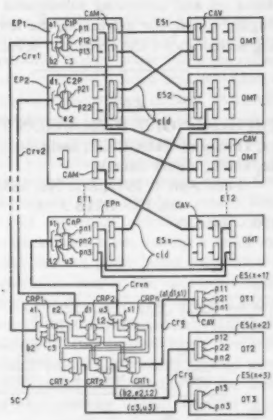
d. subjecting the quantum bits of the higher-ranking code and the downshifted quantum bits of the lower-ranking code to an algebraic summing operation with a sign depending on the relative values of the corresponding polarity bits as determined by step (c).

4,076,967

TRUNKING PROCEDURE AND ARRANGEMENT FOR THE CONNECTION OF FUNCTIONAL UNITS

Philippe Cailloux, Antony, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel S. A., Paris, France

Filed Dec. 6, 1976, Ser. No. 747,852
Claims priority, application France, Dec. 31, 1975, 75 40326
Int. Cl.[2] H04Q *3/06*
U.S. Cl. 179—18 AG **7 Claims**

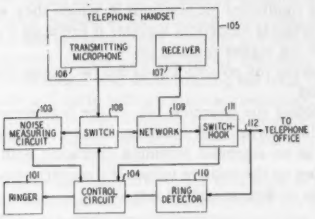


2. A trunking system of connections between blocks in a telecommunications exchange structure having at least two stages, each stage comprising a plurality of blocks and each block comprising a plurality of functional units of a majority type and a minority type, comprising: direct trunk connections of standardized capacity providing direct inter-stage connection between majority functional units of two adjacent stages, regrouping means for indirect inter-stage connection of minority functional units, said regrouping means having first connections including a multi-function connector to different blocks of a stage including connections pertaining to minority functional units of different types and second connections regrouping the first connections by functional type of minority unit and connected via said direct trunk connections of standardized capacity by stage-spanning portions to blocks of an adjacent stage specific to the respective types of functional unit, whereby the stage-spanning portion of the innerstage connections of minority functional units are provided by standardized trunks.

4,076,968
TELEPHONE RINGER INTENSITY CONTROL RESPONSIVE TO AMBIENT NOISE

Blake Lane Wattenbarger, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sep. 2, 1976, Ser. No. 719,909
Int. Cl.[2] H04M *1/26*
U.S. Cl. 179—84 R **10 Claims**



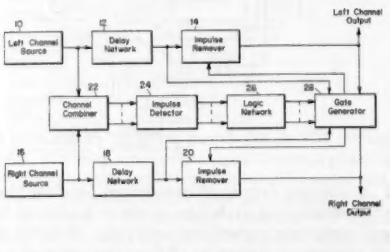
1. A telephone set including means responsive to an incoming ringing signal for generating an audible alerting signal; characterized by:

a loudness control responsive to audible sounds, external to said telephone set and occurring prior to the arrival of the ringing signal, for establishing a threshold amplitude level of the audible alerting signal and responsive to audible sounds including the contribution of the audible alerting signal to the level of the audible sounds, external to said telephone set and occurring subsequent to the arrival of the ringing signal, for increasing the level of the audible alerting signal above the threshold level.

4,076,969
IMPULSE NOISE REDUCTION SYSTEM

Jack Sacks, Thousand Oaks, Calif., assignor to Singer & Singer, Torrance, Calif., a part interest

Filed Apr. 7, 1975, Ser. No. 565,876
Int. Cl.[2] G11B *3/00*
U.S. Cl. 179—100.4 D **15 Claims**



1. A system for detecting undesired signals on a record medium having desired recorded signal information comprising:

means for generating a pair of correlated signals termed signal A and signal B from said desired recorded signal information on said record medium,

means for combining said pair of correlated signals A and B to attenuate said desired recorded signal information and enhance undesired signals,

means for generating a gating signal having a leading edge determined by said undesired signals and a trailing edge directly determined by said desired recorded signal information, and

means for generating at least one delayed output signal from said desired recorded signal information,

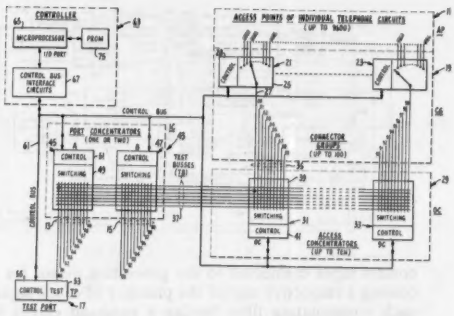
gating means for gating out undesired signals from said delayed output signal with said gating signal, and

means for substituting information that is consistent with said desired recorded information during said gating signal.

4,076,970
SWITCHING SYSTEM HAVING A CENTRAL CONTROLLER FOR ACCESSING INDIVIDUAL TELEPHONE CIRCUITS FOR TESTING

Andre Lubarsky, Jr.; G. Scott Warner, and Goro R. Tahara, all of Sunnyvale, Calif., assignors to Telecommunications Technology, Inc., Sunnyvale, Calif.

Filed Oct. 4, 1976, Ser. No. 729,585
Int. Cl.[2] H04M *3/22*
U.S. Cl. 179—175.2 R **16 Claims**



1. A system for selectively connecting any one of a first set of a plurality of electrical circuit points to any one of a second set of a plurality of electrical circuit points, comprising:

means including a plurality of separately controllable switching units for selectively connecting any one of said first set of circuit points to any one of said second set of circuit points in response to control signals,

means for developing an electrical signal representative of two circuit points, one from each of said first and second sets, that are desired to be connected together,

means independent of said connecting means and connected between each of said switching units and said signal developing means for communicating control and status signals therebetween, and

means including programmed microprocessor connected to said control signal communicating means in a manner to communicate control and status signals in two directions between it and any of said signal developing means and switching units for making a connection between one circuit point of said first set of electrical circuit points and one circuit point of said second set of electrical circuit points as specified by said signal developing means.

4,076,971
SUBSCRIBER LINE TESTING SYSTEM

Takuji Mukaemachi, and Yutaka Fukushima, both of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

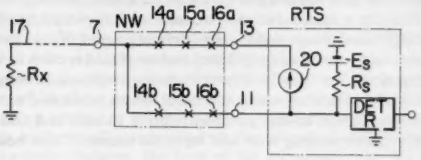
Filed Sep. 8, 1976, Ser. No. 721,216
Claims priority, application Japan, Sep. 12, 1975, 50-111489; Dec. 30, 1975, 50-158563; Dec. 30, 1975, 50-158564
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 R **8 Claims**

1. A subscriber line testing system comprising:

a. a channel network having a first channel including a line terminal, first and second trunk terminals and at least one current self-holding semiconductor switching device connecting said line terminal with said first trunk terminal, and a second channel including at least one current self-

holding semiconductor switching device for connecting said line terminal with said second trunk terminal;

b. a subscriber line connected to said line terminal; and



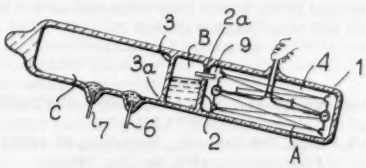
c. a line test trunk including a floating current source connected to said first and second trunk terminals and a test circuit connected to said second trunk terminal.

4,076,972

LIQUID CONTACT SWITCH HAVING PLURAL COMPARTMENTS AND ELECTRICAL HEATER

Jean Efther, 20, rue de l'Aubepine, Antony, France (92160), and Jean Denisselle, 43 B[d] Victor, Paris, France (75015)

Filed May 10, 1976, Ser. No. 685,097
Int. Cl.[2] H01H *29/00*
U.S. Cl. 200—33 A **9 Claims**



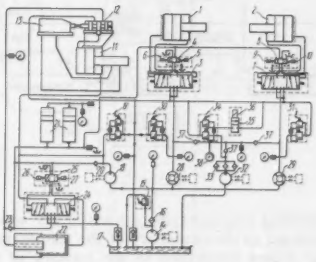
1. An electrical switch including a closed reservoir subdivided into three compartments comprising, a power compartment, a control compartment and an intermediate compartment, a body of electrically conductive liquid normally contained within said intermediate compartment, said power compartment and intermediate compartment being separated by a first impermeable wall provided with a first channel at the bottom thereof to allow the passage of said conductive liquid between the intermediate compartment and power compartment, the bottom wall of said power compartment being inclined to urge the return of liquid to the intermediate compartment and being provided with two spaced electrodes, said intermediate compartment and control compartment being separated by a second impermeable wall provided with a second channel above the normal level of the liquid conductor when contained in the intermediate compartment, and the electrical resistor in said control compartment for heating gas in said control compartment when energized, said second channel being provided with means to allow the passage of gas between compartments but to resist the passage of conductive liquid therethrough, whereby when the gas is heated by the energized resistor, pressure of the gas in the intermediate compartment is increased to displace conductive liquid into the power compartment to complete an electrical circuit between said two electrodes.

4,076,973

RESISTANCE TYPE FLASH BUTT WELDER

Viktor Senderovich Lifshits, Kavkazsky bulvar, 21, korpus 2, kv.41, Moscow; Alexandr Alexandrovich Sukhanov, prospekt Lenina, 10a, kv.67, Elektrostal Moskovskoi oblasti; Nikolai Makarovich Dergachev, prospekt Juzhny, 7, korpus 1, kv.178, Elektrostal Moskovskoi oblasti; Arkady Alexeevich Pevnev, Oktyabrskaya ulitsa, 13, kv. 44, Elektrostal Moskovskoi oblasti; Vladimir Nikitich Baranov, prospekt Lenina, 30/13, kv. 16, Elektrostal Moskovskoi oblasti, and Leonid Pavlovich Shklyanov, ulitsa Zhulyabina, 8, kv.14, Elektrostal Moskovskoi oblasti, all of U.S.S.R.

Filed Aug. 20, 1976, Ser. No. 716,257
Int. Cl.[2] B23K *11/04*
U.S. Cl. 219—97 **5 Claims**



1. A resistance type flash butt welding apparatus, comprising moving and stationary clamps adapted for gripping articles being welded; hydraulic drives controlling the clamping and releasing of said articles being welded and provided with slide valves ensuring individual control of said hydraulic drives; gear means for transferring the moving clamp with respect to the stationary one, said gear means comprising at least one hydraulic ram, pilot valve means for controlling said hydraulic ram, control means employing an actuator means for controlling said pilot valve, and first oil plant means feeding said hydraulic drives; said apparatus including: a second self-contained pumping accumulator plant having a relief valve in its delivery circuit, and second plant being associated hydraulically with said hydraulic ram of the moving clamp transfer gear means; a device for decreasing pressure in the hydraulic ram of said moving clamp transfer gear means and in the pilot valve during flashing of the articles being welded and for increasing said pressure during upsetting of said articles; said device being a differential circuit adapted for feeding said hydraulic ram of the moving clamp transfer gear means through said pilot valve means, being fitted with an additional slide valve and a nonreturn valve for switching a hydraulic ram drain from the differential ram feed circuit to free drain at the instant the flashing operation is at an end, said device being fed from said second self-contained pumping accumulator plant; a low-pressure high-capacity pump with a filter, a relief valve, a nonreturn valve and an unloading slide valve, said high capacity pump being adapted to feed said hydraulic drives of both the moving and stationary clamps; high-pressure, low-capacity pumps with relief valves, said pumps being associated hydraulically with said clamp hydraulic drives; a device for automatic switching over the clamp hydraulic ram feed circuit from the low-pressure pump operating during preliminary clamping of the articles being welded to the high-pressure pumps operating during final clamping of said articles; said device being adapted for switching over the oil pumps and comprising a low-pressure pump unloading slide valve being associated hydraulically with said low pressure pump and electrically with the high-pressure pump motors for switching them on at the moment the low-pressure pump is being unloaded; said second pumping accumulator plant and high-pressure pumps being connected to the first oil plant, with a hy-

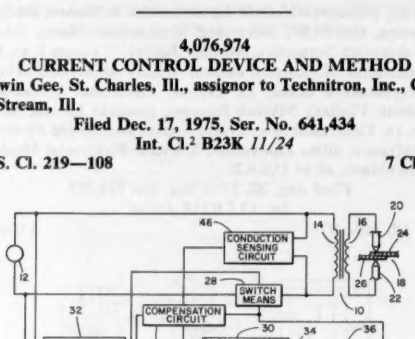
draulic control of the slide valves of the moving and stationary clamps being connected to the second pumping accumulator plant.

4,076,974

CURRENT CONTROL DEVICE AND METHOD

Edwin Gee, St. Charles, Ill., assignor to Technitron, Inc., Carol Stream, Ill.

Filed Dec. 17, 1975, Ser. No. 641,434
Int. Cl.[2] B23K *11/24*
U.S. Cl. 219—108 **7 Claims**



1. In a welding circuit having a transformer welding electrodes connected to the secondary of the transformer and an AC voltage source connected to the primary of the transformer, an improvement for regulating current in said primary winding comprising:

a synchronizing circuit means for generating a signal in fixed phase relationship with the zero crossings of the signal from said AC voltage source;

means for generating a nonlinear control signal in synchronism with the signal from said synchronizing circuit, said control signal having a decelerating negative slope during one portion thereof and an accelerating negative slope during a second portion thereof;

a conduction sensing circuit means for generating a conduction signal indicative of whether or not a voltage exists across said primary;

a compensation circuit means responsive to said synchronizing signal and said conduction signal for temporarily clamping the initial output level of said control signal during the times between the zero crossings of the voltage from said AC voltage source and the next interruption of current through said primary;

means for comparing said nonlinear control signal with a reference signal and for generating a switching signal indicative of whether or not said control signal is less than said reference signal; and

first switch means responsive to said switching signal for permitting current to flow between said AC voltage source and said primary in response to said switching signal.

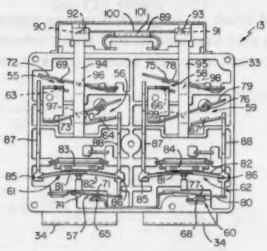
4,076,975

ELECTRICAL FURNACE AND PARTS THEREFOR

Hugh J. Tyler, and Denis G. Wolfe, both of Santa Ana, Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Feb. 25, 1976, Ser. No. 661,056
Int. Cl.[2] H05B *3/02*
U.S. Cl. 219—483 **20 Claims**

1. In combination, a frame means, a plurality of electrical heaters carried by said frame means and having terminal means, control means carried by said frame means for said heaters and having terminal means, and a rigid lead unit carried by said frame means and having rigid lead means directly and electrically interconnected to said terminal means of said heaters and said control means, said unit having terminal means for electrically interconnecting said rigid lead means to power source leads whereby said power source leads will be directly and electrically interconnected to said terminal means of said heaters and said control means by said rigid lead means, said rigid lead unit having a manually operated switch means for opening said rigid lead means to disconnect said power source leads from said heaters and said control means, said rigid lead unit having a removable section, said section carrying part of said rigid lead means and thereby defining a part of said switch means, said part of said rigid lead means of said section having connections for axially interconnecting with said terminal means of said heaters and said control means when said section is axially moved to one position relative to said unit and for axially disconnecting with said terminal means of said heaters



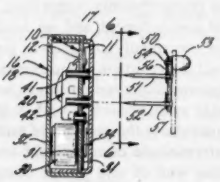
and said control means when said section is axially moved to another position relative to said unit, said section having other connections disposed intermediate said terminal means for said power leads and said connections for said terminal means of said heaters and said control device, said other connections axially interconnecting with said rigid lead means disposed between said section and said terminal means for said power source leads when said section is axially moved to said one position thereof and for axially disconnecting with said rigid lead means disposed between said section and said terminal means for said power source leads when said section is axially moved to said other position thereof.

4,076,976

FLASH ASSEMBLY FOR CLOTHING-SUPPORTED JEWELRY

Russell S. Fenton, 308 Eaton St., Northfield, Ill. 60062

Filed Nov. 26, 1976, Ser. No. 745,366
Int. Cl.[2] F21V *33/00*
U.S. Cl. 362—104 **5 Claims**



1. A flash assembly for clothing-supported jewelry comprising, in combination, a miniature circuit board having front and back surfaces, a pair of sockets arranged in parallel relation on the back surface and presenting spaced pin-receiving openings at the front surface, a jewelry mounting plate made of a flat piece of insulating material of a size substantially smaller than the circuit board and having a light-emitting diode projecting forwardly from the face thereof, the mounting plate having a pair of sharp, stiff pins of small diameter connected to the light-emitting diode, the pins being parallel to one another and spaced to coincide with the socket openings, the pins being in penetrating relation to the mounting plate and supported thereon cantilever fashion, a circuit module and battery on the

back surface of the circuit board, the circuit module comprising an oscillator circuit having its input connected to the battery and its output connected to the sockets, a housing for the circuit board in the form of a flat box of plastic having a mated front and back closely fitted to the circuit board, the front of the box having clearance openings registering with the socket openings, the back of the box serving as a stop in the path of movement of the pins to preclude scratching of the user by the points of the pins, the sockets providing frictional retention for the pins so that upon entry of the pins into the sockets with a layer of clothing in between the housed circuit board and mounting plate are mutually captive and the light-emitting diode is electrically connected to the output of the oscillator for periodic flashing, the face of the mounting plate having sufficient surface to support a piece of jewelry in integrated relation with the light-emitting diode.

4,076,977
LIGHT MEASURING CIRCUIT WITH STRAY CAPACITANCE COMPENSATING MEANS

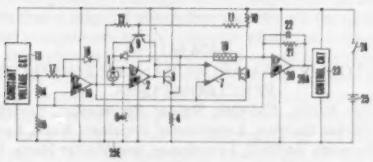
Tokuichi Tsunekawa, Yokohama, and Tetsuya Taguchi, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1975, Ser. No. 644,317

Claims priority, application Japan, Dec. 28, 1974, 49-2479; Jul. 2, 1975, 50-82116

Int. Cl.² H01J *39/12;* **G01J** *1/32*

U.S. Cl. 250—206 **31 Claims**



14. A light measuring system comprising:

(a) a photosensitive element having an output terminal;

(b) an amplifier connected to the output terminal of said photosensitive element;

(c) means for compensating the time-lag response of the amplifier caused by stray capacitance within at least said amplifier, said compensating means being connected to said amplifier at an output terminal thereof and provided with a switching element actuated in response to an operative condition of said amplifier upon starting of photometry; and

(d) an output circuit connected to an output terminal of said amplifier.

4,076,978
FIBER OPTIC BUNDLE BEAM EXPANDER WITH IMAGE INTENSIFIER

Thomas M. Brennan, Cambridge, and Robert M. Burley, Concord, both of Mass., assignors to Baird-Atomic, Inc., Bedford, Mass.

Continuation of Ser. No. 593,361, Jul. 7, 1975, abandoned, which is a continuation of Ser. No. 419,040, Nov. 26, 1973, abandoned. This application Oct. 14, 1976, Ser. No. 732,347

Int. Cl.² H01J *31/50;* **G02B** *5/16, 23/08*

U.S. Cl. 250—213 VT **5 Claims**

1. A biocular viewing system comprising:

a. a sealed housing in a periscope configuration having an input section and an output section, said input section and said output section at opposite ends of said housing;

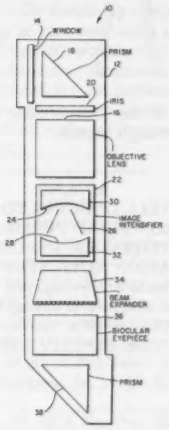
b. a right angle prism mounted within said housing adjacent said input section;

c. objective lens means;

d. an iris positioned between said right angle prism and said objective lens means, rays from an object to be viewed being directed to said objective lens means through said right angle prism and said iris, said rays forming an image at the focus of said objective lens means;

e. image intensifier means having input and output sections, an image focused on said input section by said objective lens means, an amplified image presented at said output section;

f. unidirectional fiber optic bundle beam expander means including fiber optic bundle means and unidirectional diffuser means, said fiber optic bundle means having input and output faces, said unidirectional diffuser means formed in said output face at an image plane of said fiber



optic bundle means, said fiber optic bundle means having a numerical aperture that is less than unity, said amplified image at said output section being directed towards said input face and being transmitted to said output face by said unidirectional fiber optic bundle means, said unidirectional diffuser means operative to spread unidirectionally the energy in the numerical aperture of said fiber optic bundle means for biocular viewing of said image; and

g. biocular eyepiece means in optical registration with said unidirectional fiber optic bundle beam expander means, said biocular eyepiece means presenting said unidirectionally spread image at said output face for biocular viewing.

4,076,979
BOTTLE COLOR IDENTIFICATION APPARATUS

Arthur Walter, Denzlingen; Günter Fetzer, Gundelfingen, and Jurgen Erdmann, Buchholz, all of Germany, assignors to Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik, Waldkirch, Germany

Filed Jun. 30, 1976, Ser. No. 701,341

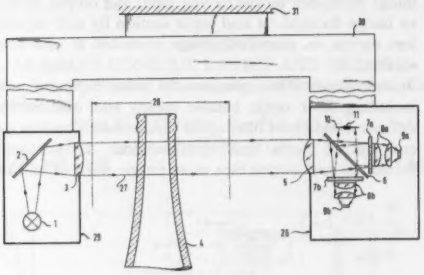
Claims priority, application Germany, Jul. 29, 1975, 2533873

Int. Cl.² G01J *3/34, 3/50*

U.S. Cl. 250—226 **7 Claims**

1. An apparatus for the identification of bottle colors, comprising means for passing a light beam through the bottle, means for receiving the light beam passing through the bottle, said receiving means comprising a spectral decomposition arrangement which emits a signal characteristic of the bottle color, said spectral decomposition arrangement comprising two photoelectric cells with different filters, two comparators each having an input and an output, means for applying the output signals of said two photoelectric cells to the inputs of said two comparators, and means including three AND gates

for combining the outputs of said two comparators for forming a white, green and brown signal, and means for emitting both



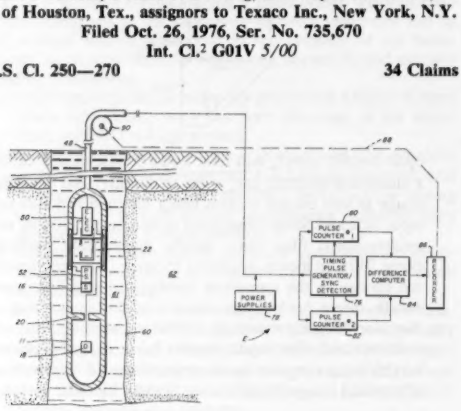
the single signals of the photoelectric cells and the signals combined from the single signals.

4,076,980

RADIOACTIVE WELL LOGGING TO MEASURE EARTH FORMATION FLUID PERMEABILITY BY ELECTROHYDRAULIC INDUCED FLOW OF RADIATION ACTIVATED FLUIDS

Dan M. Arnold; Donald J. Dowling, and Wayne F. Warren, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,670
Int. Cl.² G01V *5/00*
U.S. Cl. 250—270 **34 Claims**



1. A method of measuring the fluid permeability of subsurface earth formations in the vicinity of a well borehole, comprising the steps of:

(a) bombarding fluid in the borehole with high energy neutrons to activate the borehole fluid to thereby emit radiation;

(b) imparting a radially directed pressure pulse to the activated fluid to cause flow of the activated fluid;

(c) detecting the amount of radiation from activated fluid flowing vertically in the borehole in response to said pressure pulse to thereby obtain a measure of the fluid permeability of the formations.

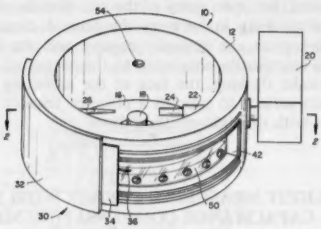
4,076,981

POSITION SENSITIVE AREA DETECTOR FOR USE WITH X-RAY DIFFRACTOMETER OR X-RAY CAMERA

Robert A. Sparks, Palo Alto; George B. Rothbart, Menlo Park, and Roger N. Samdahl, San Jose, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 29, 1976, Ser. No. 709,691
Int. Cl.² G01M *23/20*
U.S. Cl. 250—272 **28 Claims**

1. A position-sensitive detector adapted, during operation thereof, to hold an ionizable gasuous medium and suitable for use in detecting x-rays diffracted over a wide angle from a sample under analysis; said detector comprising housing having a hollow detector chamber therein, said housing having a curved side wall having an elongate opening therein, a back cathode plane and at least one anode wire spaced therefrom disposed within said detector chamber in the path of x-rays entering said detector chamber through said elongate opening,



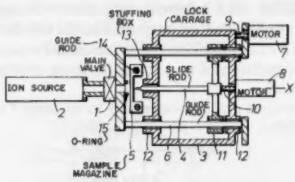
said back cathode plane comprising a plurality of spaced cathode conductors on an insulator support, each anode wire extending substantially transverse to the elongated dimension of said cathode conductors and being mechanically supported only at the ends thereof and otherwise being orientated in planar arcuate form, during operation of said detector, solely by electrostatic forces created by potential differences between each anode wire and said cathode conductors.

4,076,982

AUTOMATIC SAMPLE-CHANGER FOR MASS SPECTROMETERS

Hans-Peter Ritter, Cologne; Rainer Strewinsky, Leverkusen; Hans-Dieter Bulwien, Leverkusen; Engelbert Koch, Leverkusen; Hermann Bartholl, Leverkusen, and Walter Hupp, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 6, 1976, Ser. No. 729,929
Claims priority, application Germany, Oct. 31, 1975, 2548891
Int. Cl.² B01D *59/44*
U.S. Cl. 250—288 **10 Claims**



1. An automatic sample changer for a mass spectrometer having a vapourising device and a lock region, the changer comprising: a slide rod movable into and out of the vapourising device, a crucible holder mounted on one end of the slide rod and adapted to hold a crucible for the sample to be vapourised for insertion by the slide rod into the mass spectrometer; high vacuum lock means including a lock carriage in which the slide rod is mounted and which is capable of independent parallel movement relative to the slide rod, a stuffing box disposed on the end face of the lock carriage directed towards the mass spectrometer for effecting the vacuum tight passage of the slide rod and means for sealing the space between the end face of the lock carriage, the stuffing box and the lock region of the mass spectrometer when the lock carriage has moved into contact with that lock region, and a sample magazine adapted to move relative to the slide rod to allow sample crucibles to be taken selectively from the magazine by the crucible holder.

4,076,983

ANALYSIS OF EMULSIONS AND SUSPENSIONS

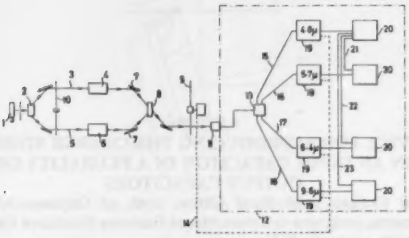
Joseph Hopkins, Cramlington, and David McKenna, Birtley, both of England, assignors to Sir Howard Grubb Parsons & Company Ltd., England

Filed Aug. 2, 1976, Ser. No. 710,704

Claims priority, application United Kingdom, Aug. 4, 1975, 32510/75

Int. Cl.[2] G01N *21/26*

U.S. Cl. 250—341 3 Claims



1. A method for the quantitative estimation of the dispersion medium and one or more components forming the disperse phase of an emulsion or suspension or mixture thereof, wherein the mean particle size of the disperse phase is less than a selected absorption wavelength of the dispersion medium and also less than a selected absorption wavelength for each of one or more components of the disperse phase, and the said selected absorption wavelength of the dispersion medium is at a wavelength differing substantially from the or each selected absorption wavelength for the disperse phase component or components and the absorption by the or each disperse phase component is stronger than the absorption by the dispersion medium at the selected absorption wavelength for the or each disperse phase component, said method comprising the steps of:

a. passing a first beam of radiation from a source of infra-red radiation through a sample of fixed path length of the dispersion medium only of an emulsion or suspension to be analysed, and a second beam of the radiation through a second reference sample of fixed path length of the dispersion medium only;

b. selecting a narrow range of wavelength of radiation from the two beams containing the selected absorption wavelength of the dispersion medium and effecting a balance in the resultant measured energy of the beams subsequent to their passage through the dispersion medium samples for this range of wavelength by way of backing-off means in one channel of multi-channel measuring circuitry reading this range of wavelength only;

c. successively repeating step (b) for different narrow ranges of wavelength of radiation for each selected absorption wavelength of the remaining components of the disperse phase using in each repetition of separate channel of the multi-channel measuring circuitry associated with the respective narrow range of wavelength chosen;

d. replacing the sample of dispersion medium in the first beam of radiation by a sample of the emulsion or suspension or mixture thereof to be analysed having the same fixed path length, selecting the same narrow range of wavelength of radiation from the two beams as in step (b) and measuring and storing the absorbance due to the disperse phase of the sample being analysed in terms of the imbalance in the resultant measured energy of the beams subsequent to their passage through the dispersion medium reference sample and the sample being analysed for this range of wavelength;

e. selecting a narrow range of wavelength of radiation from the two beams containing the selected absorption wavelength of a component of the disperse phase whilst maintaining the sample being analysed in the first beam of radiation and the reference sample of dispersion medium in the second beam of radiation and determining the absorbance due to this component in terms of the resultant absorbance indicated by the measured imbalance of energy in the two beams summated with the product of the stored value from step (d) and the ratio of the absorption coefficient of the dispersion medium at this selected narrow range of wavelength to the absorption coefficient of the dispersion medium at the narrow range of wavelength selected in step (b); and

f. successively repeating step (e) using a different narrow range of wavelength of radiation for each selected absorption wavelength of the remaining components of the disperse phase whilst in each case using the product of the stored value from step (d) with the ratio of the absorption coefficient of the dispersion medium at the narrow range of wavelength selected for the particular disperse phase component determination to the absorption coefficient of the dispersion medium at the narrow range of wavelength selected in step (b).

4,076,984

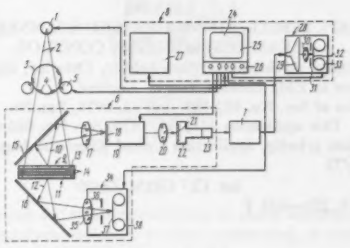
INTROSCOPE

Jury Vasilievich Gromov, 9 ulitsa Sokolinoi gory, 3, kv. 61, Moscow; Boris Ivanovich Leonov, Oktyabrasky prospekt, 164, kv. 53; Oleg Petrovich Smirnov, 115 kvartal, ulitsa Jubileinaya, 17, kv. 48, both of Ljubertsy Moskovskoi oblasti; Nikolai Nikolaevich Smirnov, ulitsa Demyana Hednogo, 20, korpus 5, kv. 12, Moscow; Ljudmila Lavrentievna Nagornaya, ulitsa Danilevskogo, 31, kv. 6, and Yakov Abramovich Zakharin, ulitsa Ekonomicheskaya, 14, kv. 59, both of Kharkov, all of U.S.S.R.

Filed Jun. 23, 1976, Ser. No. 699,074

Int. Cl.[2] G03B *41/16*

U.S. Cl. 250—367 37 Claims



1. An introscope comprising:

a source of radiation generating a flow of penetrating radiation which passes through a tested object with reference marks set thereon;

a first fluoroscopic converter having a certain spectrum of luminescence which is positioned in the path of said penetrating radiation after said test object and which transforms said penetrating radiation into a first flux of visible light which contains information on the shadow interior of said test object;

a first mirror placed in relation to the first fluoroscopic converter so that it receives the first flux of visible light transmitted from said first fluoroscopic converter;

a lens positioned so that it receives the first flux of visible light reflected from the first mirror;

an image converter positioned so that the first flux of visible light reflected from the first mirror comes through said lens and into said image converter, said image converter amplifying said first flux of visible light;

a closed-circuit television system positioned so that it receives the first flux of visible light amplified in said image converter;

a pickup television tube of said closed-circuit television system having a photocathode, which is the input element of this system, said photocathode receives the first flux of visible light after it is amplified in the image converter and amplifies said flux;

a unit of intermediate video signal amplification and processing having an input and an output and being connected by its input to said pickup tube;

a monitor display unit of said closed-circuit television system having an input and a television screen and being connected by its input to said output of said unit of intermediate videosignal amplification and processing, said television screen records the shadow image of said interior of said test object;

a second fluoroscopic converter having a spectrum of luminescence other than said spectum of luminescence of the first fluoroscopic converter which is positioned in the path of said penetrating radiation after said test object parallel to the first fluoroscopic converter so that it also receives said penetrating radiation and which transforms said penetrating radiation into a second flux of visible light which contains information on the shadow interior of said test object;

a second mirror positioned in relation to the second fluoroscopic converter so that it receives the second flux of visible light transmitted from second fluoroscopic converter;

a cinema recorder having a film and being positioned so that it receives the second flux of visible light reflected from the second mirror, said film records the shadow image of the interior of said test object and serves to correct by said reference marks the shadow image of the interior of said test object obtained simultaneously on said television screen of said monitor display unit; and

a remote control unit for controlling said radiation source, said image converter and said cinema recorder.

4,076,985

COMPUTERIZED TOMOGRAPHIC SCANNER WITH BEAM DISTRIBUTION CONTROL

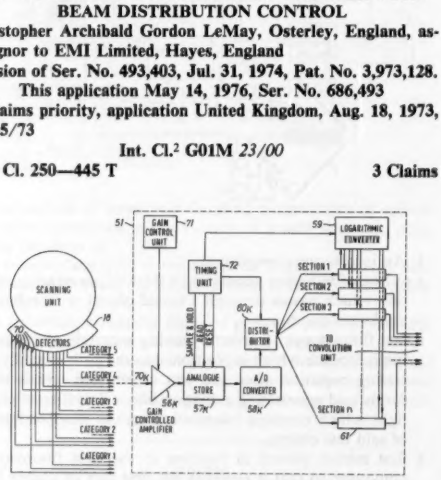
Christopher Archibald Gordon LeMay, Osterley, England, assignor to EMI Limited, Hayes, England

Division of Ser. No. 493,403, Jul. 31, 1974, Pat. No. 3,973,128. This application May 14, 1976, Ser. No. 686,493

Claims priority, application United Kingdom, Aug. 18, 1973, 39145/73

Int. Cl.² G01M *23/00*

U.S. Cl. 250—445 T **3 Claims**



1. Apparatus for examining a body by means of penetrating radiation, such as x-radiation, comprising a source of said radiation arranged to project said radiation along at least one path through a substantially planar region of the body, means for scanning said source relative to said body to project said radiation through said region along further paths, detector means for providing output signals indicative of the amount of absorption suffered by said radiation on traversing said paths, said detector means including a plurality of detectors, adjacent ones of which are disposed to receive radiation along respective paths inclined to each other at a given angle, and means being provided for sampling said detectors in groups at interleaved times to derive therefrom output signals relating to sets of substantially parallel paths, corresponding paths in neighboring sets being inclined on each other at an angle greater than said given angle.

4,076,986

DEVICE FOR REPRODUCING THE CHARGE STORED IN AN INPUT CAPACITOR IN A PLURALITY OF OUTPUT CAPACITORS

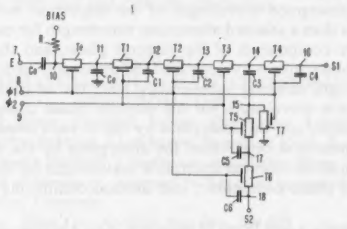
Alain Croisier, and René Glaise, both of Cagnes-sur-Mer, France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 6, 1976, Ser. No. 730,057

Claims priority, application France, Oct. 31, 1975, 75 33884

Int. Cl.² H03K *17/02, 17/56*

U.S. Cl. 307—221 D **6 Claims**



1. An N stage bucket brigade device (BBD) for reproducing in each of N output capacitors the same charge quantity stored in an input capacitor, wherein N is an integer, comprising

an input capacitor, N bucket brigade device stages, each stage including

a first field effect transistor having first and second controlled current carrying electrodes and a control electrode to which a first clock signal is applied, and a first capacitor having a first and a second terminals, said first terminal being connected to said second controlled electrode of said first transistor, a second field effect transistor having first and second controlled current carrying electrodes and a control electrode to which a second clock signal is applied, and a second capacitor having a first and a second terminals, said capacitor being connected between said second controlled electrode of said first transistor and the control electrode, said second controlled electrode of said first transistor being connected to said first controlled electrode of said second transistor,

means for connecting said input capacitor to said first controlled electrode of said first transistor in said first one of said N BBD stages,

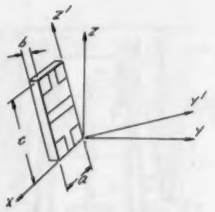
means for causing said input capacitor and said first capacitors in each of said N stages to be connected in series when said first transistors in said N stages are in their conductive state, and

means for causing said second terminal of said first capacitors in each of said N stages to be connected to ground while said first transistors in said N stages are turned off and said second transistors in said N stages are turned on.

4,076,987
MULTIPLE RESONATOR OR FILTER VIBRATING IN A COUPLED MODE

Alphonse E. Zumsteg, Solothurn, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management Services S.A., Bienne, Switzerland

Filed Dec. 10, 1976, Ser. No. 749,559
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—361 **10 Claims**



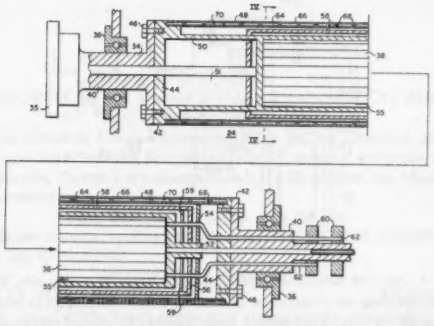
2. A multiple resonator or filter comprising a bar of Y cut quartz rotated approximately 35° and having its greatest dimension (length) arranged along the rotated optical (Z')axis, said bar being arranged and adapted to vibrate in a mode in which thickness shear vibrations are strongly coupled to even harmonic flexure vibrations, the width/thickness ratio where width is measured along the electric (X)axis having the following range of values

1.1 to 1.9 for coupling with the 2nd flexure harmonic
2.2 to 3.6 for coupling with the 4th flexure harmonic
3.6 to 5.3 for coupling with the 6th flexure harmonic
5.1 to 6.8 for coupling with the 8th flexure harmonic
6.5 to 8.4 for coupling with the 10th flexure harmonic
8 to 10.4 for coupling with the 12th flexure harmonic and wherein at least two energy trapping zones are provided on the bar said zones extending over the entire width of the bar.

4,076,988
SUPERCONDUCTING DYNAMOELECTRIC MACHINE HAVING A LIQUID METAL SHIELD

Donald C. Litz, Franklin Township, Cambria County, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 17, 1976, Ser. No. 715,259
Int. Cl.[2] H02K *9/00*
U.S. Cl. 310—52 **4 Claims**



1. A superconducting dynamoelectric machine comprising a frame enclosing a stator having an armature winding therein, and a rotor supporting a superconducting dc field winding arranged for rotation in said stator,

means for supporting said rotor for rotation on bearings in said frame,

said rotor including a cylindrical member completely enclosing said field winding,

means on said cylindrical member supporting the field winding, said means being of sufficient structural strength to absorb torque forces imposed on said rotor during operation,

radiation shield means in said cylindrical member for absorbing thermal radiation from structural members operating in substantially ambient temperature,

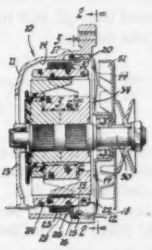
said cylindrical member including damper shield means which contains an electrically conductive liquid which is effective in restoring torque to the rotor when load system changes and in shielding the superconductive field winding from ac fields generated in the stator during operation, and

means in said shaft for supplying excitation current to said winding and cooling means associated with said machine for furnishing a fluid coolant to said rotor for maintaining the field winding at about 4.2° K.

4,076,989
HOUSING AND STATOR ASSEMBLY FOR A DYNAMOELECTRIC MACHINE

Richard D. Watson, Chesterfield, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 2, 1976, Ser. No. 702,217
Int. Cl.[2] H02K *5/00*
U.S. Cl. 310—89 **3 Claims**



1. A housing and stator assembly for an easily assembled and disassembled dynamoelectric machine comprising, in combination:

a generally cylindrical case having an open axial end, the case having an inner surface defining first axial stop means adjacent and facing the open axial end and second axial stop means between the first axial stop means and the open axial end and facing the first axial stop means;

a stator in the cylindrical case, the stator having peripheral mounting means axially abutting the first axial stop means and one or more circumferentially extending, axially rising ramps facing the second axial stop means, the stator being adapted for insertion into the cylindrical case through the open axial end into abutment with the first axial stop means; and

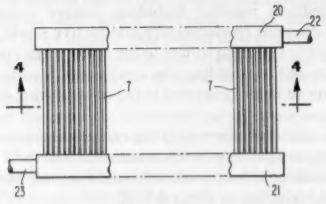
an end cap for the cylindrical case, the end cap having one or more tabs wedged between the ramps and the second axial stop means to lock the end cap in the open end of the cylindrical case and the stator assembly within the cylindrical case, the end cap being adapted for axial insertion into the open end past the second axial stop means and subsequent rotation with the tabs moving circumferentially between the ramps and the second axial stop means into locking engagement therebetween.

4,076,990

TUBE TARGET FOR FUSION NEUTRON GENERATOR

George O. Hendry, Napa; John L. Hilton, Walnut Creek, both of Calif., and Jinchoon Kim, Oak Ridge, Tenn., assignors to The Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Oct. 8, 1975, Ser. No. 620,715
Int. Cl.[2] H01J *7/24, 39/00*
U.S. Cl. 313—61 S 14 Claims



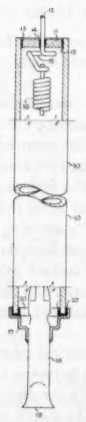
1. A neutron-producing target for use with a fusion neutron generator comprising:
- an array of closely-spaced parallel neutron generating tubes arranged in planar rows, the neutrons being generated in response to ions impinging upon said tubes;
- a first, coolant input manifold connecting said tubes at respective first ends thereof;
- a second, coolant withdrawal manifold connecting said tubes at respective ends thereof opposite said first ends;
- a cooling liquid; and
- means for coupling said liquid to said first manifold and for withdrawing fluid from said second manifold, whereby said liquid is passed through said tubes in parallel fashion with respect to one another.

4,076,991

SEALING MATERIALS FOR CERAMIC ENVELOPES

Ranajit K. Datta, Cleveland Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed May 6, 1977, Ser. No. 794,398
Int. Cl.[2] H01J *61/36;* C04B *35/50*
U.S. Cl. 313—220 9 Claims



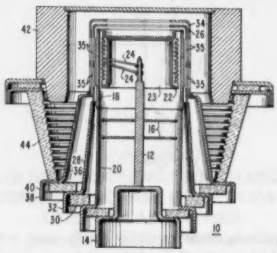
1. A sealing composition for sealing to ceramics comprising reacted material characterized by proportions of 20–80% by weight Dy_2O_3, 0–55% by weight Al_2O_3 and 5–45% by weight SiO_2.

4,076,992

VACUUM TUBE GRID STRUCTURES OF PHOSMIC BRONZE HAVING COPPER AND COPPER ALLOY CONICAL SUPPORTS

John Thomas Mark, Millersville, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Jun. 22, 1976, Ser. No. 698,368
Int. Cl.[2] H01J *1/46, 21/10*
U.S. Cl. 313—296 7 Claims



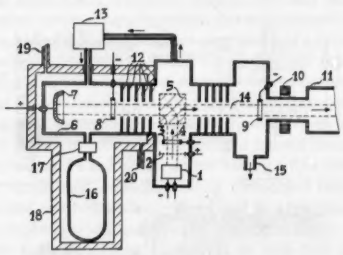
1. A vacuum tube comprising:
- a cylindrical cathode;
- a frusto-conical Phosnic bronze control grid extending coaxially around the cathode;
- a first hollow truncated cone having it smaller diameter end attached to the larger diameter end of the control grid, the first cone being made of a copper;
- a cylindrical Phosnic bronze screen grid extending coaxially around the control grid;
- a second hollow truncated cone having its smaller diameter end attached to one end of the screen grid and extending around the first cone, the second cone being made of a copper clad alloy of cobalt, nickel and iron; and
- an anode extending around the screen grid.

4,076,993

ION SOURCE FOR HIGH INTENSITY ION BEAM

Karl Nowak, Mollard gasse 8, A 1060 Vienna 6, Austria

Filed Aug. 1, 1974, Ser. No. 494,400
Claims priority, application Austria, Aug. 13, 1973, 7092/73
Int. Cl.[2] H05H *5/02*
U.S. Cl. 313—360 5 Claims



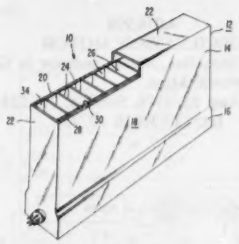
1. An ion source for producing a high intensity ion beam comprising an evacuable chamber, a hot cathode (1) and an anode (7) supported within said chamber in spaced relationship to each other, a plurality of spaced, perforated, dividing walls (12) supported within said chamber between said hot cathode and said anode and in spaced relationship to said cathode and said anode, a deflection magnet including magnetic pole pieces (5) adjacent said chamber near the space between said hot cathode and said plurality of walls and means for introducing a gas between said anode and said plurality of walls.

4,076,994

FLAT DISPLAY DEVICE WITH BEAM GUIDE

Charles Hammond Anderson, Rocky Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 9, 1976, Ser. No. 675,639
Int. Cl.[2] H01J *29/70, 31/00, 31/10*
U.S. Cl. 313—422 25 Claims



1. In a display device which includes
an evacuated envelope having mutually spaced, substantially parallel front and back walls,
a phosphor screen adjacent to and substantially coextensive with the inner surface of said front wall,
means in said envelope for generating and directing electrons in a path between and substantially parallel to said front and back walls, and
guide means along said path for confining the electrons in a beam and deflecting the beam toward said phosphor screen at selected points along said path,
the improvement comprising said guide means including
a plurality of conductors adjacent to said back wall, said conductors being spaced along and extending transversely across said beam path, and
a plurality of electrodes along opposite sides of the beam path between and spaced from the front and back walls and disposed in planes extending between and substantially perpendicular to the front and back walls, said electrodes being adapted to provide an electrostatic field around the beam path which will confine the electrons in the beam as the electrons flow along the beam path.

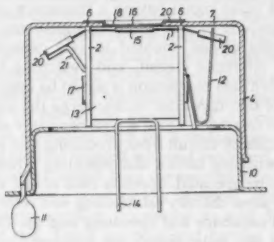
4,076,995

ELECTRON BEAM PRODUCING ARRANGEMENT FOR A CATHODE RAY TUBE

Rainer Kolbeck; Heinz Kuckenburg, both of Ulm (Danube), and Klaus Schaffernicht, Herrlingen, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 15, 1977, Ser. No. 768,706
Claims priority, application Germany, Feb. 20, 1976, 2606897; Feb. 20, 1976, 50947
Int. Cl.[2] H01J *29/02, 29/04*
U.S. Cl. 313—446 23 Claims

23. An electron beam producing arrangement comprising a vessel-shaped control electrode, an end wall for said vessel-shaped control electrode defining an opening for passage of the electron beam, a cylindrical inner surface for said vessel-shaped control electrode and surrounding said end wall, two substantially rectangular insulating washers within said vessel-shaped control electrode abutting said cylindrical inner wall with opposite sides thereof, abutting said end wall with third sides thereof and defining notches in said third end walls and a straight line cathode wire supported in said notches substantially parallel to said end wall below said opening in said end wall.

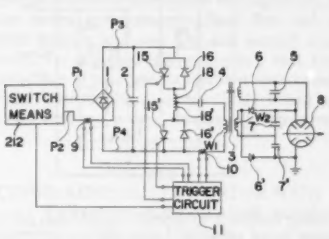


4,076,996

POWER SUPPLIER FOR MAGNETRON

Naoyoshi Maehara, Nara; Hiroshi Fujieda, Kashiwara, and Tatsuo Saka, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sep. 8, 1976, Ser. No. 721,548
Claims priority, application Japan, Sep. 12, 1975, 50-111439; Sep. 16, 1975, 50-112435; Dec. 23, 1975, 50-154182
Int. Cl.[2] H05B *41/36*
U.S. Cl. 315—106 11 Claims



1. A power supplier which converts A.C. power supplied from a commercial A.C. power source to high voltage D.C. power to be supplied to a magnetron, comprising:
(a) a switch means for connecting said power supplier to said commercial A.C. power source;
(b) a first rectifying means connected to said switch means for producing a D.C. voltage from said commercial A.C. power source;
(c) a resonance circuit having an inductive element and a capacitive element connected in series;
(d) at least one thyristor switching circuit connected in series with said resonance circuit and further connected to said first rectifying means, for providing said D.C. voltage to said resonance circuit when triggered;
(e) a trigger circuit connected to said thyristor switching circuit for triggering said thyristor switching circuit and causing said thyristor switching circuit to conduct;
(f) a step-up transformer having the primary winding serving as the main part of said inductive element in said resonance circuit, at least one secondary winding generating high voltage energy and a nonsaturable core; and
(g) a second rectifying means connected to said secondary winding of said step-up transformer for producing a D.C. voltage to supply the magnetron.

7. A power supplier for a magnetron as claimed in claim 1, wherein said trigger circuit means comprises;
(a) an adjustable reference circuit including a capacitor for

producing across said capacitor a reference signal having a preadjusted value;

(b) an oscillator circuit coupled to said reference circuit for producing said pulse signal upon receipt of said reference signal, said pulse signal having a frequency proportional to the magnitude of said reference signal; and

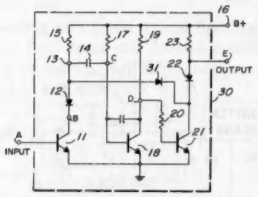
(c) a switching circuit coupled to said capacitor in said adjustable reference circuit, said switching circuit connecting when said magnetron is not to be operated, opposite ends of said capacitor to discharge the same thereby ending said reference signal across capacitor and preventing said oscillator circuit from producing said pulse signal, and said switching circuit disconnecting when said magnetron is to be operated, opposite ends of said capacitor to charge the same thereby establishing said reference signal across said capacitor and operating said oscillator circuit to produce said pulse signal, the frequency of said pulse signal gradually increasing during said establishment of said reference signal, whereby said converted A.C. power gradually increases in an initial stage to protect said magnetron from a sudden change in the input power thereto.

4,076,997

DIODE FEEDBACK MONOSTABLE MULTIVIBRATOR IN A TRANSISTOR IGNITION SYSTEM

John Richard Davidson, Crystal Lake, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 18, 1976, Ser. No. 697,512
Int. Cl.[2] H05B *37/02, 39/04, 41/14*
U.S. Cl. 315—209 T **22 Claims**



1. A diode feedback monostable multivibrator comprising:

a trigger input terminal adaptable for receiving a trigger signal having transitions of a predetermined polarity;

a first current source means coupled to said input terminal;

a capacitor having first and second terminals, said capacitor first terminal coupled to said input terminal;

a second current source means coupled to said capacitor second terminal;

said first and second current source means alternately charging said capacitor in response to the reception by said trigger input terminal of a trigger signal having a transition of a predetermined polarity;

first switch means having first and second output terminals and a control terminal, said control terminal coupled to said capacitor second terminal, said first switch means being switched on and off operative conditions in response to the reception of said trigger signal transition by said trigger input terminal;

a second switch means having a control terminal coupled to one of said first and second output terminals of said first switch means, said second switch means having first and second output terminals and providing an output signal at one of its output terminals having magnitudes corresponding to each of the operative conditions of said first switch means; and

means including a feedback diode coupled between said one of said first and second output terminals of said second switch means and said capacitor first terminal;

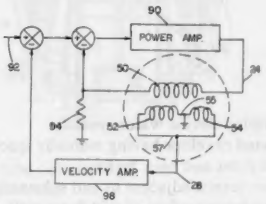
wherein an output pulse having a duration equal to a predetermined time is produced at said one of said first and second output terminals of said second switch means in response to a trigger signal transition of a predetermined polarity, and said diode including means provides a feedback path from said one of said first and second output terminals of said second switch means to said capacitor first terminal for maintaining said capacitor first terminal at a predetermined voltage level for a duration equal to said predetermined time after the reception of said trigger signal transition.

4,076,998

OSCILLATION MOTOR

Jean I. Montagu, Brookline, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Aug. 23, 1976, Ser. No. 716,535
Int. Cl.[2] H02K *33/12*
U.S. Cl. 318—132 **14 Claims**



1. A bearing free oscillation motor comprising

a stator defining a cylindrical cavity,

a rotor having a cylindrical portion disposed within said cavity, said cylindrical portion having a diameter that provides an axially extending annular gap between said cylindrical portion and said cylindrical cavity of radial width in the range of one-five percent of the diameter of said cylindrical portion,

a low viscosity liquid in said gap that provides essentially no viscous damping of said rotor,

an axially extending torsion shaft having one end secured to said stator, and its other end secured to said rotor for fixing the axial position of said cylindrical portion in said cylindrical cavity and permitting limited rotational oscillation of said rotor,

one of said stator and said rotor carrying a permanent magnet that provides a magnetic field transverse to the axis of rotation of said rotor, a drive winding on the other of said stator and said rotor for receiving an electric current flow that interacts with said magnetic field to produce a torque that rotationally deflects said rotor,

and a tachometer winding responsive to rotational deflection of said rotor for feeding back a velocity signal to electrically damp rotational motion of said rotor.

4,076,999

CIRCUIT FOR LIMITING THE SPINDLE SPEED OF A MACHINE

Clarence Roy Edwards, Stuartsdraft, and Ellwood Donald Fickes, Waynesboro, both of Va., assignors to General Electric Company, New York, N.Y.

Filed Feb. 19, 1976, Ser. No. 659,449
Int. Cl.[2] H02H *5/00*
U.S. Cl. 318—465 **3 Claims**

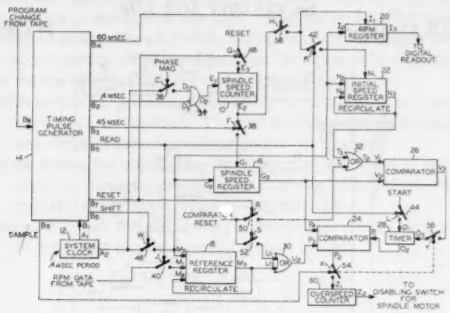
1. Apparatus for insuring that the rotational speed of a spindle on a machine is prevented from exceeding a selected speed, comprising:

a. means for continuously receiving pulsed signals indicative of the instantaneous rotational speed of the spindle over a timed cycle, wherein the cumulative signal within said receiving means at the end of each timed cycle is representative of the actual rotational speed of the spindle;

b. a first register for receiving a first signal representative of a selected desired rotational speed of the spindle;

c. a second register for receiving from said receiving means a second signal representative of a percentage of the actual rotational speed of the spindle after a lapse of the same percentage of the timed cycle;

d. means for comparing the first signal with the second signal at the end of each timed cycle, and for generating a third signal each time the second signal is greater than the first signal;



e. means for generating a fourth signal after receiving a predetermined number of third signals to disable a motor which drives the spindle; and

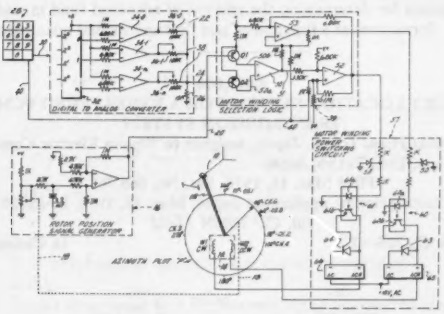
f. means for preventing generation of the fourth signal for a predetermined time after the first signal representative of the selected desired rotational speed of the spindle is received within said first register to avoid an unwanted disabling of the motor, which drives the spindle, within the predetermined time.

4,077,000

DIRECTIONAL ANTENNA AZIMUTH CONTROL SYSTEM

Jerry A. Grubbs, 678 Leland Drive, Taylor Mill, Ky. 41015

Filed Jan. 13, 1977, Ser. No. 759,249
Int. Cl.[2] G05B *19/30*
U.S. Cl. 318—604 **6 Claims**



1. The apparatus comprising:

a directional antenna,

means mounting said antenna for rotation about a generally vertical axis to a plurality of predetermined different azimuthal directions respectively associated with different broadcast transmitters, each said transmitter being identified by a different decimal channel identification number,

a bidirectional motor drivingly connected to said antenna and having selectively alternatively energizable first winding and second winding for rotating said antenna in first and second opposite azimuthal directions, respectively, when said frst and second winidings are respectively selectively alternatively energized,

an encoder including

(a) a plurality of digital keys for sequentially entering the digits of transmitter identification numbers,

(b) a digital encoder connected to said keys and having a plurality of different output lines each uniquely associated with a different one of said plurality of different azimuthal directions associated with different broadcast transmitters, said digital encoder responsive to said keys for providing a signal on the output line thereof corresponding to the direction associated with the broadcast transmitter identification number entered into said keyboard, said signals on said different output lines corresponding to said different directions being substantially identical, and

(c) an analog encoder connected to said different output lines of said digital encoder and having a single output terminal for providing, in response to sequential identical signals on different ones of said output lines, sequential d.c. voltages of differing magnitude at said single output terminal,

an antenna azimuthal direction transducer responsive to said antenna direction for sequentially providing d.c. voltages of differing magnitude on the same output line, said differing magnitude voltages corresponding to sequential different azimuthal orientations of said antenna,

a comparator for comparing said voltages on said output lines of said antenna transducer and analog encoder, said comparator having a first output terminal and a second output terminal on which first and seocnd control signals are provided when the difference between said outputs of said antenna transducer and analog encoder bear first and second predetermined relationships in magnitude, and

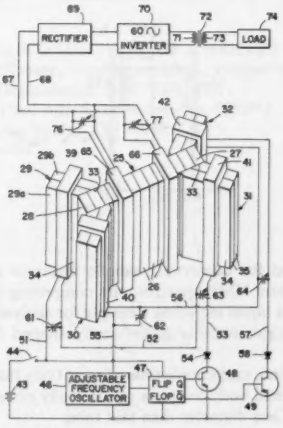
motor drive means interconnecting said first and second comparator outputs and said first and second windings, respectively, for alternatively energizing said first and second windings in response to said first and second control signals, respectively, to alternatively rotate said antenna in said first and second directions, respectively.

4,077,001

ELECTROMAGNETIC CONVERTOR WITH STATIONARY VARIABLE-RELUCTANCE MEMBERS

Frank B. Richardson, 2610 San Gorgoino, Las Vegas, Nev. 89110

Filed Apr. 16, 1976, Ser. No. 677,731
Int. Cl.[2] G05F *7/00*
U.S. Cl. 323—92 **53 Claims**



1. A converter comprising:

a. permanent magnet means having spaced-apart poles of opposite polarity and having a permanent magnetic field externally of said magnet means, said field comprising

magnetic lines of force extending from pole to pole of said magnet means,

b. variable-reluctance means for shifting the pattern of said lines of force, said variable-reluctance means having a relatively low magnetic reluctance in one direction therethrough when electrically energized and a relatively high magnetic reluctance in said one direction therethrough when electrically de-energized, said variable-reluctance means being disposed in said permanent magnetic field and in fixed relation to said permanent magnet means, said variable-reluctance means comprising at least one unmagnetized but magnetizable core having spaced-apart faces and side edges extending between said faces, the distance between said faces being the least distance through said core, said core having a lamellar distribution of magnetism from face to face thereof when magnetized,

c. means for cyclically electrically energizing and de-energizing said variable-reluctance means and including an electrically conductive excitation coil means surrounding said core, the plane of said coil means being substantially inclined relative to the planes of said faces,

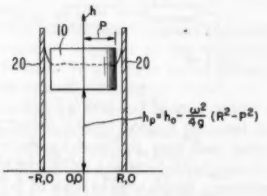
d. electrical conductor means disposed in said permanent magnetic field in fixed relation to said permanent magnet means and having at least one conductor positioned to be cut by lines of magnetic force in said field during a shift in the pattern of said lines of magnetic force.

4,077,002

METHOD AND APPARATUS FOR NMR SAMPLE TUBE VORTEX PLUG

Barbara L. Erwine, Palo Alto, and Stephen H. Smallcombe, Cupertino, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Nov. 22, 1976, Ser. No. 743,893
Int. Cl.² G01R *33/08*
U.S. Cl. 324—0.5 AH **10 Claims**



1. Method for conserving sample materials necessary for high resolution NMR spectroscopy comprising the steps of:

inserting a liquid including a sample for analysis in a substantially right, circular cylindrically shaped NMR sample tube;

inserting into said sample tube an inert body floatable on said liquid, said body having a substantially circular cross-section of less diameter than said tube;

inserting said tube including said liquid and floating body into an NMR spinner apparatus;

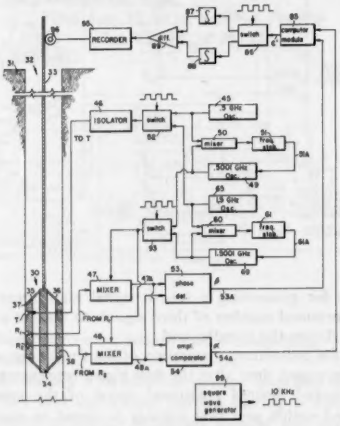
spinning said tube at high speed in a high magnetic field, whereby said body restricts the formation of a vortex on the surface of said liquid in said tube.

4,077,003

MICROWAVE METHOD AND APPARATUS UTILIZING DIELECTRIC LOSS FACTOR MEASUREMENTS FOR DETERMINATION OF ADSORBED FLUID IN SUBSURFACE FORMATIONS SURROUNDING A BOREHOLE

Rama N. Rau, League City, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Apr. 8, 1976, Ser. No. 674,792
Int. Cl.² G01V *3/12, 3/18*
U.S. Cl. 324—6 **24 Claims**



1. Apparatus for determining the amount of adsorbed fluid in formations surrounding a borehole, comprising:

means for deriving a first quantity which is a function of the dielectric loss factor of said formations as measured by passing electromagnetic energy of a first frequency through said formations;

means for deriving a second quantity which is a function of the dielectric loss factor of said formations as measured by passing electromagnetic energy of a second frequency through said formations; and

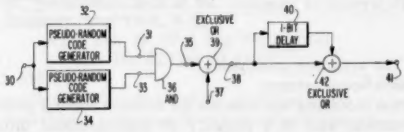
means for determining the amount of adsorbed fluid in said formations as a function of said first and second quantities.

4,077,004

FAULT LOCATION SYSTEM FOR A REPEATERED PCM TRANSMISSION SYSTEM

Yoshiki Higo, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Mar. 11, 1976, Ser. No. 665,760
Claims priority, application Japan, Mar. 18, 1975, 50-32756
Int. Cl.² H04N *17/02*
U.S. Cl. 325—2 **16 Claims**



9. In a fault location system for a repeatered PCM transmission system including a first means for transmitting through a repeatered transmission line fault location codes, said fault location codes being capable of code conversion into codes having their two states controllable in response to a repeater-designation frequency, a second means disposed at a designated repeater for receiving the fault location codes including

repeater transmission errors, a third means for extracting a component of the repeater-designation frequency signal from the received fault location codes by means of a fault locating circuit built into the repeater and including an additional code-converter, and a fourth means for receiving said extracted repeater-designation frequency signal component at a transmitting point of the fault location codes, the improvement wherein the fault location codes are based on pseudo-random codes and one of said two states of said codes having the occurrence probability of the digit "1" equal to k sufficiently greater or smaller than 0.5 while the other of the two states has the occurrence probability of the digit "1" equal to $(1-k)$, said first means being a code generator comprising:

fifth means for generating the codes having the occurrence probability of the digit "1" equal to k by means of at least one series of pseudo-random codes;

sixth means for controlling the change of the digits of said codes to their complementary digits in response to the repeater-designation frequency signal; and

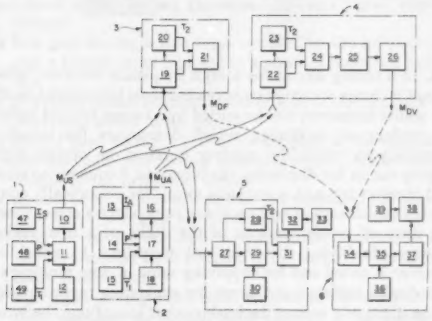
seventh means for performing differential code-conversion of the codes obtained by the second means.

4,077,005

SECURE POSITION IDENTITY AND TIME REPORTING SYSTEM

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 18, 1971, Ser. No. 154,617
Int. Cl.[2] H04K *1/00*
U.S. Cl. 325—32 **5 Claims**



1. A cryptosecure identification system comprising:

a ship;

means aboard said ship for transmitting an enciphered identification code, position, and time of day signal;

an airborne relay station;

receiver means aboard said relay station;

clock means aboard said relay station for supplying the time of day of said received enciphered signal;

means aboard said relay station for retransmitting said enciphered signal and said satellite time of day signal;

ground receiving means including means for deciphering said retransmitted enciphered signal and comparing the two time of day signals; and

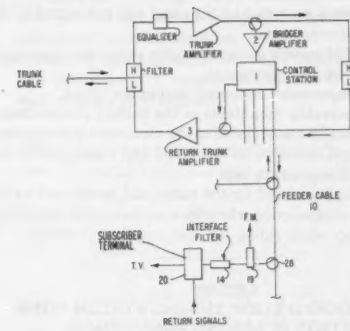
means for indicating said signal to be valid if the difference between said two time of day signals is less than a predetermined time.

4,077,006

BIDIRECTIONAL UNICABLE SWITCHING SYSTEM

Victor Nicholson, 4701 Willard Ave., Apt. 1033, Chevy Chase, Md. 20015

Continuation-in-part of Ser. No. 558,425, Mar. 14, 1975, abandoned, which is a continuation of Ser. No. 405,846, Oct. 12, 1973, abandoned. This application Mar. 30, 1976, Ser. No. 672,066
Int. Cl.[2] H04B *1/06*
U.S. Cl. 325—308 **5 Claims**



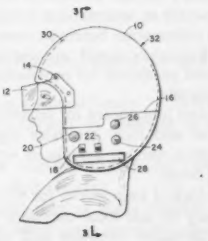
1. In a cable distribution system having a head end, means at said heat end for receiving multiple television channels, a coaxial cable having multiple channel capacity connected to said head end, a bridger amplifier connected to the coaxial cable for receiving and amplifying signals in the multiple television channels, a control station connected to the bridger amplifier, said control station including a switching network and channel converters connected to the bridger amplifier, a feeder cable having a plurality of subscriber allocated channels, said feeder cable connected to the switching network and channel converters, a plurality of subscriber drops connected to the feeder cable, each subscriber drop being connected to a single subscriber allocated channel in the feeder cable, thereby allocating one channel in the feeder cable to each subscriber drop, means at each subscriber drop for sending a control signal to the control station on the subscriber allocated channel allocated to that subscriber drop to control the switching network at the control station.

4,077,007

RADIO MOUNTED IN A HELMET

Robert D. McKinney, Manhattan, Kans., assignor to The Raymond Lee Organization, New, York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,852
Int. Cl.[2] H04B *1/08*
U.S. Cl. 325—315 **1 Claim**



1. A radio mounted in a motorcycle helmet, comprising:

a helmet,

an insulating material mounted within the helmet,

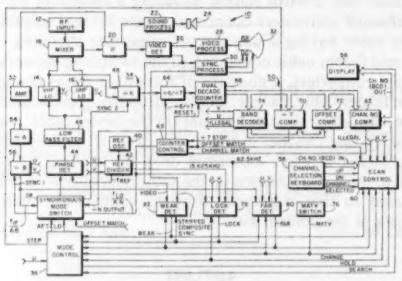
a set of electrical radio components mounted within the insulating material of the helmet,
an antenna mounted within the helmet and connected to the components,
a set of speakers each mounted in a portion of the helmet adjacent to a position for a user's ears and each speaker cushioned by the insulating material of the helmet,
the helmet forming a recessed panel on one exterior surface of the helmet,
an off switch mounted in the panel and connected to the electrical components,
a volume control mounted on the panel and connected to the electrical components,
an AM and FM switch mounted on the panel and connected to the electrical components,
a battery compartment mounted within the panel,
a battery removably mountable in the battery compartment and electrically connectable to the electronic components,
an AM control mounted on the panel and connected to the electrical components, and
an FM control mounted on the panel and connected to the electrical components, whereby a motorcyclist may listen to the radio while riding the motorcycle.

4,077,008

PHASE LOCKED LOOP TUNING SYSTEM WITH STATION SCANNING PROVISIONS

Robert Morgan Rast, Mercerville, and Juri Tults, Princeton Junction, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,673
Int. Cl.[2] H04B 1/16
U.S. Cl. 325—421 **12 Claims**



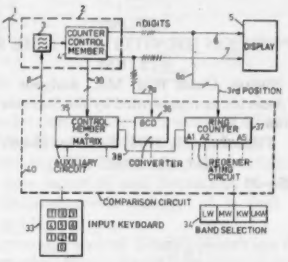
1. An apparatus for tuning a receiver capable of receiving a plurality of stations having station numbers associated therewith, comprising:
local oscillator means for generating a local oscillator signal;
mixer means for combining said local oscillator signal with a radio frequency carrier associated with a station being tuned to generate an intermediate frequency signal having at least one information bearing carrier;
intermediate frequency signal processing means having a predetermined passboard for processing said intermediate frequency signal;
first phase locked loop means for selectively controlling the frequency of said local oscillator signal in accordance with the station number associated with the station presently being tuned;
second phase locked loop means for selectively controlling the frequency of said local oscillator signal to reduce a frequency deviation between said information bearing carrier and a fixed frequency;
weak detector means for generating a weak signal representing the amplitude of said radio frequency carrier;
far detector means for generating a far signal representing the frequency deviation between the frequency of a dominant intermediate frequency signal component in said intermediate frequency passband and said fixed frequency;
switching means responsive to said far and weak signals for selectively enabling the operation of one of said first and second phase locked loop means; and
scanning means responsive to said far and said weak signals for successively changing the station number;
said scanning means being inhibited from changing the station number and said switching means enabling the operation of said second phase locked loop means when the amplitude of said radio frequency signal is greater than a predetermined threshold amplitude and the frequency of said dominant intermediate frequency signal component is within a predetermined frequency deviation from said fixed frequency determined by the expected range of a frequency offset between the frequency of said radio frequency carrier and its standard value.

4,077,009

TUNING CIRCUIT FOR HIGH FREQUENCY RECEIVERS

Otto Klank, Arpke, and Dieter Rottmann, Misburg, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt (Main), Germany

Filed Dec. 15, 1976, Ser. No. 750,635
Claims priority, application Germany, Dec. 16, 1975, 2556486
Int. Cl.[2] H04B 1/06
U.S. Cl. 325—455 **22 Claims**



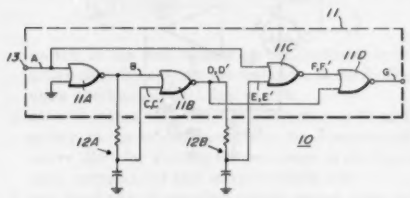
1. In a tuning circuit for a high frequency receiver, which circuit includes a voltage controllable superheterodyne oscillator whose frequency can be varied by a tuning control voltage to produce an oscillation which determines the broadcast frequency to which the receiver is tuned, an optical digital display means for displaying the broadcast frequency to which said receiver is tuned, a counting means for periodically counting the oscillations of said oscillator to produce a count state in the form of representations of the digits of a first decimal number identifying the broadcast frequency to which the receiver is tuned and for supplying same in time multiplex to said display means, input means for generating representations of the digits of a second decimal number identifying the broadcast frequency to which it is desired to tune the receiver, and a comparison circuit means for comparing said first and second decimal number representations and for producing a control voltage for said oscillator from the comparison to cause said first decimal number representation to coincide with said second decimal number representation, said comparison circuit means including a single comparator capable of comparing, at one time, only the representations of one digit of each of said first and second numbers, and a time multiplexing means, responsive to multiplex signals from said counting means, for delivering to said comparator in succession, each digit representation produced by said counting means, starting with the most significant digit, and simultaneously therewith, each digit representation of corresponding significance generated by said input means so that said display means and said comparator are controlled in synchronism; the improvement wherein said time multiplexing means comprises:
a regenerating circuit means for generating the multiplexing

signals required for the multiplex operation of said comparison circuit means; first and second means, responsive to output signals from said counting means, for producing and supplying to said regenerating circuit means at least one clock pulse signal appearing per multiplex signal for said display means and a synchronizing signal, respectively, to control said regenerating circuit means; and an auxiliary circuit means, which is responsive to output signals from said counting means, for, together with said regenerating circuit means, controlling the sequence of operation of the entire said comparison circuit means; said comparison circuit means, including said regenerating circuit means, said auxiliary circuit means and said comparator, being designed as a single circuit unit.

4,077,010
DIGITAL PULSE DOUBLER WITH 50 PERCENT DUTY CYCLE

Donald Carroll Ryon, Carol Stream, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 8, 1976, Ser. No. 748,615
Int. Cl.[2] H03B *19/00*
U.S. Cl. 328—20 **5 Claims**



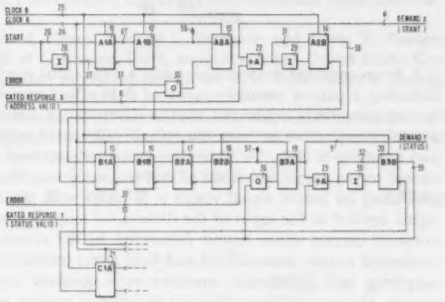
1. A frequency doubler having symmetrical duty cycle output comprising:
- an input means having the first frequency signal applied thereto;
- a first gate having a first input coupled to the input means and a second input coupled to a point of reference potential;
- a first delay means coupled to the output of the first gate for providing a first delay period;
- a second gate having a first input coupled to the output of the first gate and having a second input coupled to the output of the first delay means;
- a second delay means coupled to the output of the second gate for providing a second delay period;
- a third gate having one input coupled to the input means and having a second input coupled to the output of the second delay means; and
- a fourth gate having a first input coupled to the output of the third gate and the second input coupled to the output of the second gate, whereby the output of the fourth gate is a second frequency signal, and the second frequency being twice the first frequency and having a symmetrical duty cycle.

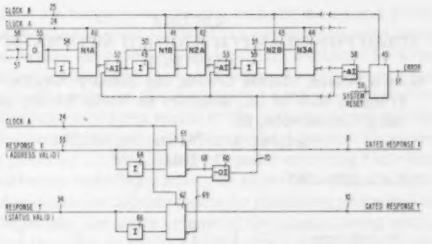
4,077,011
UNCERTAIN INTERVAL TIMER USING A VARIABLE LENGTH SHIFT REGISTER

Joseph Richard Mathis, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,335
Int. Cl.[2] G04F *10/04*
U.S. Cl. 328—129 **8 Claims**

1. A composite shift register timer comprising:
- a primary shift register,
- a secondary shift register,
- a source of first signals,
- said primary shift register being coupled to receive said first signals and being divided into portions consisting of respective numbers of shift register elements,
- said portions being selectively coupled together in successive pairs upon timely receipt of respective ones of said first signals,
- the coupling together of said primary shift register portions being blocked upon receipt of a second signal,
- means for inserting a first binary "1" into the input of the first portion of said primary shift register,
- first means for clocking said first binary "1" through each said portion and between successive portions which are selectively coupled together,
- said primary shift register producing a third signal each time said first binary "1" approaches the end of any portion of said primary shift register,



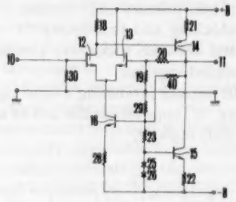


each said third signal being applied to said secondary shift register,
- means for inserting a second binary "1" into the input of said secondary shift register in response to each said third signal, and
- second means for clocking said second binary "1" through said secondary shift register,
- said secondary shift register being coupled to receive said first signal and being reset upon the occurrence of each said first signal,
- said secondary shift register producing said second signal each time said second binary "1" reaches the end of said secondary shift register,
- said second signal being applied to said primary shift register.

4,077,012
AMPLIFIER DEVICES

Masayuki Iwamatsu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Jan. 26, 1977, Ser. No. 762,926
Claims priority, application Japan, Jan. 28, 1976, 51-7590[U]
Int. Cl.² H03F *3/45*
U.S. Cl. 330—253 **5 Claims**

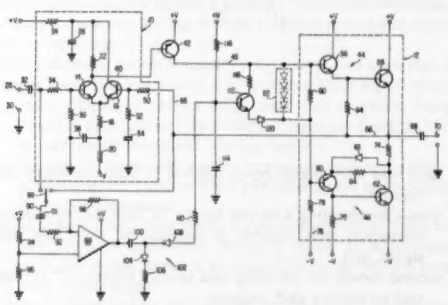


1. In an amplifier device comprising a differential amplifier including a pair of parallel-connected field effect transistors having commonly connected source electrodes, a transistor amplifier responsive to the output of said differential amplifier and acting as a class "A" amplifer, an output terminal connected to the output electrode of said transistor amplifier for producing an output signal which is in-phase with the input signal applied to the input of the differential amplifier, and a constant current drive circuit connected to the commonly connected source electrodes of said field effect transistors for supplying said differential amplifier as a constant current source, the improvement which comprises a passive impedance element connected directly between said output terminal and said constant current drive circuit for modulating the current supplied by said constant current drive circuit to the differential amplifier with a positive feedback signal according to the amplitude of the output signal.

4,077,013
AUDIO POWER AMPLIFIER WITH AUTOMATIC BIAS CONTROL

Gene S. Morez, Morton Groove, and James F. Griffin, Mount Prospect, both of Ill., assignors to Norlin Music, Incorporated, Lincolnwood, Ill.

Filed Jun. 4, 1976, Ser. No. 692,781
Int. Cl.² H03F *3/26*
U.S. Cl. 330—267 **10 Claims**



1. A power amplifier circuit including an automatic bias control comprising:

power amplifier means including an input terminal for amplifying signals applied to said input terminal; and

automatic bias control means coupled to said power amplifier for changing the state of said power amplifier from class B to class AB operation in response to an increasing signal level at said input terminal wherein said automatic bias control means includes

a high gain amplifier,

means for applying a signal which is a function of an input signal to said high gain amplifier,

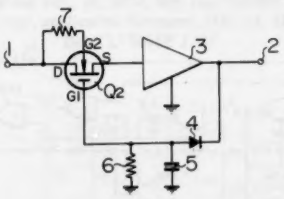
detector means coupled to said high gain amplifier for converting the output signal thereof to a bias control signal; and

electronic switching means coupled to said detector circuit means for switching between conductive and non-conductive states in response to said bias control signal.

4,077,014
AUTOMATIC GAIN CONTROL CIRCUIT

Ken Satoh, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,429
Claims priority, application Japan, Oct. 15, 1975, 50-140493[U]
Int. Cl.² H03G *3/30*
U.S. Cl. 330—278 **9 Claims**



1. An automatic gain control circuit comprising a field effect transistor having source and drain electrodes and first and second gate electrodes;

amplifier means having an output and an input, with the latter being coupled to one of said source and drain electrodes;

a portion of the output from said amplifier means being coupled through polarized diode means to said first gate electrode, forming a feedback path for obtaining automatic gain control;

an input terminal for receiving a signal to be amplified being coupled to the remaining one of said source and drain electrodes;

means for coupling said input terminal to said second gate electrode to assist in maintaining a constant voltage between said second gate electrode and said input terminal in order to minimize distortion which might otherwise occur in the amplification of a signal applied to the input terminal.

4,077,015
DUAL BANDWIDTH LOOP FILTER WITH SWEEP GENERATOR

Lansing McClain Carson, Tempe, Scottsdale, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 6, 1976, Ser. No. 646,784
Int. Cl.² H03B *3/04*
U.S. Cl. 331—4 **3 Claims**

1. In a phase locked loop including a voltage controlled oscillator, a phase comparator and a lock detector providing an output signal indicating a locked condition of the loop, dual bandwidth loop filter means and sweep acquisition circuitry comprising:

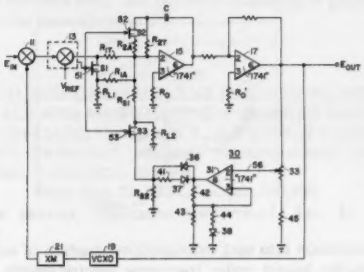
a. an acitive filter including an amplifier with a first resistor and capacitor in a feedback loop therearound and a second resistor in an input circuit thereof;

b. a regenerative comparator including a dual input amplifier

with a feedback circuit from an output thereof to one of the inputs for providing a comparator reference signal and the other of the inputs connected to receive output signals from said active filter, said comparator including circuitry associated with the output thereof for making signals of a first polarity appearing at the output substantially larger than signals of a second polarity appearing at the output;

c. first, second and third switches each having control inputs connected to receive the output signal from the lock detector and operate in response thereto;

d. resistor means connected in conjunction with said first



switch to the first resistor in the feedback loop of said active filter for altering the resistance in the feedback loop upon operation of said first switch;

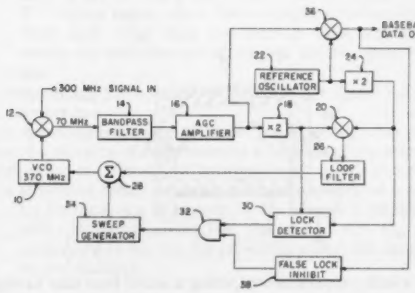
e. resistor means connected in conjuction with said second switch to the second resistor in the input circuit of said active filter for altering the resistance in the input circuit upon operation of said second switch; and

f. said third switch coupling output signals from said comparator to said active filter upon operation of said third switch for providing a sweep forcing signal to said active filter, the sweep signal produced thereby having a substantially minimized retrace time.

4,077,016
APPARATUS AND METHOD FOR INHIBITING FALSE LOCKING OF A PHASE-LOCKED LOOP

David E. Sanders, St. Petersburg; Ramon P. Chambers, Clearwater, and Robert S. Gordy, Largo, all of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 22, 1977, Ser. No. 770,557
Int. Cl.[2] H03B *3/04;* H03D *3/00*
U.S. Cl. 331—4 **21 Claims**



1. In a phase-locked loop circuit adapted to sweep a predetermined frequency range for an input signal within said range and lock on a detected input signal, said input signal being characterized in the frequency spectrum by a relatively high energy main lobe and relatively low energy side lobes, the improvement comprising a false lock inhibit circuit adapted to inhibit the loop from locking on a side lobe of an input signal, said inhibit circuit comprising:

circuit means for sensing the input signal energy at a test frequency within said frequency range and at a pair of second frequencies, said second frequencies being substantially equal increments respectively greater and less than the test frequency;

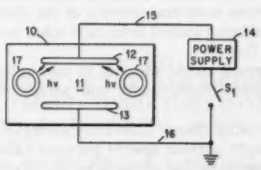
means for comparing the sensed energies; and

means for inhibiting locking of said loop circuit when the energy at the second frequencies exceeds the test frequency energy.

4,077,017
ULTRAVIOLET RADIATION INDUCED DISCHARGE LASER

Verle A. Gilson; Richard L. Schriever, and James W. Shearer, all of Livermore, Calif., assignors to The United States Government as represented by the U. S. Department of Energy, Washington, D.C.

Continuation of Ser. No. 600,242, Jul. 30, 1975, which is a continuation of Ser. No. 315,043, Dec. 14, 1972, abandoned. This application Apr. 4, 1977, Ser. No. 784,404
Int. Cl.[2] H01S *3/097*
U.S. Cl. 331—94.5 PE **3 Claims**

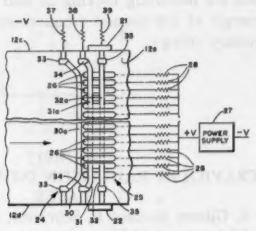


1. In a discharge device having cathode means and anode means disposed in spaced relation in a contained gaseous lasing media, means for producing an electrical discharge between the cathode means and the anode means through the gaseous lasing media, and means for electrically connecting said electrical discharge producing means to the cathode means and the anode means, the improvement comprising: the cathode means being provided with a plurality of spaced extending blade-like means, means including a source of ultraviolet radiation positioned adjacent the cathode means for producing preionization of substantially the entire volume of the gaseous lasing media between the cathode means and the anode means prior to the gas-exciting cathode-to-anode electrical discharge by photoelectric interaction between ultraviolet radiation produced by said source and the cathode means, said source of ultraviolet radiation comprising a plurality of discharge lamp mans producing ultraviolet light, said lamp means being positioned between said blade-like means of the cathode means, means separate from the gas-exciting cathode-to-anode electrical discharge producing means for activating said source of ultraviolet radiation prior to said gas-exciting cathode-to-anode electrical discharge, and means electrically separate from said first-mentioned electrically connecting means for electrically connecting said activating means to said source of ultraviolet radiation, said source of ultraviolet radiation producing an interaction in the gaseous lasing media composed of at least one effect comprised of the group consisting of cathode photoemission and volume ionization effects, whereby free electron production in the gaseous lasing media is achieved and an initial electron density is provided for the gaseous lasing media exciting electrical discharge between the cathode means and the anode means.

4,077,018
HIGH POWER GAS TRANSPORT LASER

Theodore S. Fahlen, San Jose, and Russell F. Kirk, Sunnyvale, both of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Mar. 1, 1976, Ser. No. 662,941
Int. Cl.[2] H01S 3/097
U.S. Cl. 331—94.5 PE 1 Claim



1. High power gas transport laser apparatus comprising a channel having top and bottom walls and side walls, a gas mixture comprising carbon dioxide in said channel, means for moving said gas mixture through said channel at a predetermined velocity,

means for producing an electric discharge in said gas mixture transversely of the direction of flow comprising

three cylindrically tubular cathodes disposed between said top and bottom walls transversely of the direction of said gas flow and being spaced from each other in the direction of said gas flow,

a plane segmented anode adjacent to said bottom wall and extending substantially under and parallel to said cathodes,

said cathodes being spaced differently above said anode and having straight parallel spaced portions extending transversely of the direction of gas flow and coextensive with said anode,

a ballast resistor connected in series between each of said cathodes and said energizing means, the values of said ballast resistors being different, and

means for electrically energizing said cathodes and anode to establish therebetween a glow mode electric discharge through said flowing gas mixture, and

mirror means adjacent the side walls of the channel and optically aligned with said electric discharge for directing a beam of coherent light therethrough.

4,077,019
TRANSVERSE MODE CONTROL IN DOUBLE-HETEROSTRUCTURE LASERS UTILIZING SUBSTRATE LOSS

William Streifer, Palo Alto; Donald R. Scifres, and Robert D. Burnham, both of Los Altos, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 5, 1976, Ser. No. 655,323
Int. Cl.[2] H01S 3/19
U.S. Cl. 331—94.5 H 4 Claims

1. An electrically pumped, solid-state, diode laser comprising:

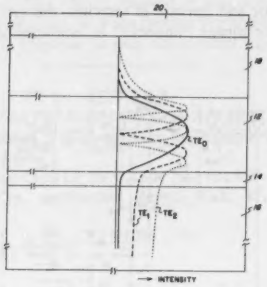
a semiconductor body including a radiation lossy portion and a plurality of layers adjacent said radiation lossy portion, one of said layers being an active region layer;

a rectifying junction within said body, said rectifying junction bordering said active region layer;

means for forward biasing said rectifying junction, carriers injected across said junction upon sufficient forward biasing of said junction undergoing radiative recombination in said active region layer to generate stimulated coherent radiation including ordered transverse electric modes;

said active region layer being separated from said radiation lossy portion of said body by at least another of said plurality of layers, said another layer being of a material having a bandgap higher than the bandgap of the material of said active region layer,

said active region layer being at least 0.8 micron thick and said another layer being not greater than about 0.5 micron thick, whereby the higher order transverse electric modes of said ordered transverse electric modes have substantial

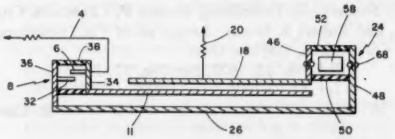


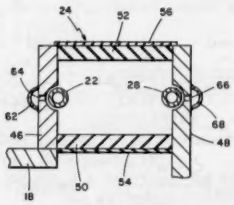
penetration into said radiation lossy portion of said body and the lowest order transverse electric mode of said ordered transverse electric modes has little penetration into said radiation lossy portion of said body such that the radiation losses of the higher order transverse electric modes are substantially greater than the radiation losses of the lowest order transverse electric mode providing lowest order transverse electric mode operation by the laser.

4,077,020
PULSED GAS LASER

Louis W. Anderson, and William A. Fitzsimmons, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed May 20, 1975, Ser. No. 579,268
Int. Cl.[2] H01S 3/097
U.S. Cl. 331—94.5 PE 3 Claims





1. In a lasing apparatus comprising a sealed laser tube having opposite spaced electrodes thereon, a switch for controlling the flow of electrical energy to said tube, and coupling means connected between said tube and said switch for coupling electrical energy from said switch to said tube, the improvement wherein each said electrode comprises an arcuate shaped elongated element mounted on opposite sides of said tube on the interior walls thereof, a gas inlet manifold coextensive with

one of said electrodes along the outside of a first wall of said tube, a gas exhaust manifold coextensive with the other of said electrodes mounted along the outside of a second wall of said tube, each of said tube walls having openings extending therethrough from its associated manifold to the interior of said tube and wherein said switch comprises a sealed enclosure, a first flat electrode mounted on an interior wall of said enclosure and extending therefrom, a second flat electrode mounted on another interior wall of said enclosure and extending therefrom said first electrode and having a portion spaced a slight distance therefrom, side switch electrodes overlapping each other and wherein said switch electrodes are large compared to the distance between them and the area of overlap is great compared to the same distance.

4,077,021

METHOD AND ARRANGEMENT FOR CODING BINARY SIGNALS AND MODULATING A CARRIER SIGNAL

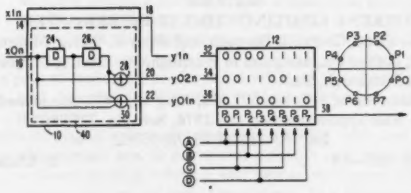
Istvan Peter Csajka, Mahopac, N.Y., and Gottfried Ungerboeck, Adliswil, Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 23, 1977, Ser. No. 799,405

Claims priority, application Switzerland, Jun. 18, 1976, 7800/76

Int. Cl.[2] **H04L** *27/12, 27/20*

U.S. Cl. 332—9 R **4 Claims**



1. A method for transmitting a bit sequence by modulating a carrier signal to sequentially assume one of a plurality of discrete signal values comprising the steps of:

subdividing the predetermined bit sequence into successive groups each containing r sequential bits,

expanding each r bit group into a group of $r+1$ bits by a sequential coding process utilizing four internal states,

selecting one out of 2^{r+1} discrete carrier signal values as a function of each $r+1$ expanded bit group, the selection being made so that 2^{r-1} carrier signal values correspond to each transition from one internal state of the coding process to one of two possible follower states and that the 2^{r-1} carrier signal values have a larger minimum distance from each other than the absolute minimum distance within the complete set of discrete carrier signal values, and

transmitting the selected discrete carrier signal values in sequence.

3. A modulation system for causing a carrier signal to assume one of a plurality of finite states as a function of the sequential application of a plurality of information bit signals comprising:

a sequential coder means including a plurality of terminals (r) for receiving in sequence r bit groups of signals each said r bit group having bits $x0_n$, $x1_n \ldots x(r-1)_n$, means responsive to the bits for providing coded bits according to the relations:

1) $y02_n = x0_n \oplus x0_{n-2}$, and

2) $y01_n = x0_n \oplus x0_{n-1} \oplus x0_{n-2}$, and

3) $y1_n = x1_n$, thru

4) $y(r-1)_n = x(r-1)_n$;

modulating means for modulating a carrier signal to assume in sequence one of 2^{r+1} discrete signal values in response to the output of the sequential coder means, the discrete signal values being separated from each other such that the complete set of signal values can be subdivided into two pairs of subsets (A, B and C, D), in which

$$d_{min\ I} > d_{min\ G} > d_{min\ M}$$

where,

$d_{min\ I}$ = minimum distance between signal values within a given subset,

$d_{min\ G}$ = minimum distance between signal values within a pair of subsets, and

$d_{min\ M}$ = minimum distance between signal values within the complete set, the connections between the sequential coder outputs and the modulator inputs being arranged so that the outputs $y01_n$ and $y02_n$ selects the subset of signal values and the remaining outputs associated with the bit group select the assigned signal value within the selected subset.

4,077,022

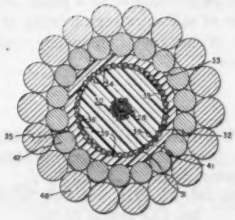
WELL LOGGING METHOD AND MEANS USING AN ARMORED MULTICONDUCTOR COAXIAL CABLE

Robert W. Pitts, Jr., Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 494,578, Aug. 5, 1974, abandoned, which is a division of Ser. No. 427,156, Dec. 21, 1973, Pat. No. 3,855,468. This application Nov. 10, 1975, Ser. No. 630,242

Int. Cl.[2] **H01P** *3/06;* **H03H** *7/04;* **H01B** *11/18;* **H04B** *3/28*

U.S. Cl. 333—1 **4 Claims**

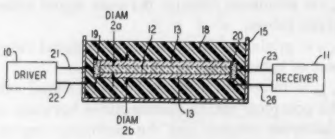


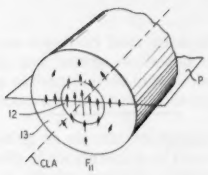
1. A shieldless cable comprising first means for conducting a high frequency signal; second means spatially arranged with said first means in a predetermined manner for a return path for the high frequency signal while conducting different low frequency or direct current signals, said second means including groups of conductors arranged in a predetermined relationship to said first means, means separating the groups of conductors for insulating each conductor group from any other conductor group, and means for passing the high frequency signal and for blocking the low frequency or direct current signals, so as to effectively couple the groups of conductors with each other for the high frequency signal and to decouple the groups of conductors from each other for the low frequency or direct current signals; and third means spatially arranged with said second means for providing protection to the first and second means and a return path for the low frequency or direct current signals.

4,077,023
ELASTIC WAVEGUIDE

Gary Delane Boyd, Rumson, and Robert Norton Thurston, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 26, 1976, Ser. No. 745,097
Int. Cl.[2] H03H *9/00, 9/26, 9/30;* H01L *41/10*
U.S. Cl. 333—30 R 17 Claims





1. In combination,

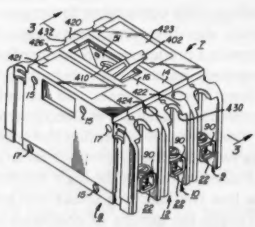
a waveguide for elastic waves comprising, a core region having a central longitudinal axis, said core region being of a material in which bulk elastic waves can be propagated, and a cladding region enclosing all surfaces except end surfaces of said core region, said cladding region also being of a material in which bulk elastic waves can be propagated, at least one of said core and cladding regions including means for focusing elastic wave energy toward said core region, and

means for launching bulk elastic waves in said waveguide in a mode in which the principal particle displacement is substantially perpendicular to a plane through said axis, the diameter of said core region being at least twice the wavelength of the lowest frequency component of said elastic waves.

4,077,024
MULTI-POLE CIRCUIT BREAKER

Albert D. Lisnay, Sarasota, Fla., assignor to Heinemann Electric Company, Trenton, N.J.

Filed Jul. 22, 1976, Ser. No. 707,626
Int. Cl.[2] H01H *71/02*
U.S. Cl. 335—8 5 Claims



1. A multi-pole circuit breaker unit comprising

at least two poles in side-by side abutment, each pole including a case of electrical insulating material,

a linkage mechanism and an electromagnetic device for actuating said linkage mechanism on predetermined overloads,

a movable contact and a stationary contact, said linkage mechanism including a movable arm carrying said movable contact into and out of engagement with said stationary contact,

said case being divided longitudinally through its width into two approximate half cases,

said linkage mechanism including an actuator,

said case defining a compartment for said linkage mechanism and a V-shaped well separated by wall structure from said compartment,

said wall structure having an opening through which said actuator extends into said V-shaped well,

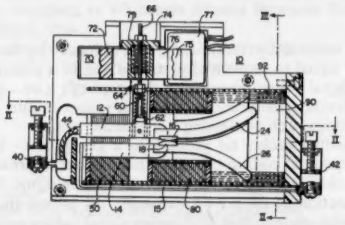
one of said actuators extending beyond said well to be manually grasped for manually opening and closing the contacts, and

interconnecting means extending through said actuators, through the V-shaped wells, and through the abutting half cases of abutting poles for joint movement of said actuators.

4,077,025
CURRENT LIMITING CIRCUIT INTERRUPTER

Paul G. Slade, Churchill Borough, and John A. Wafer, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 577,518, May 15, 1975, abandoned.
This application Sep. 21, 1976, Ser. No. 725,080
Int. Cl.[2] H01H *75/10, 77/02*
U.S. Cl. 335—16 26 Claims



1. A circuit interrupter comprising:

a housing;

a fixed contact disposed within said housing;

a fixed elongated contact arm supporting said fixed contact;

a movable contact disposed within said housing;

a movable elongated contact arm supporting said movable contact being movable between a closed position wherein said fixed contact and said movable contact are in engagement and an open position wherein said fixed contact and said movable contact are separated;

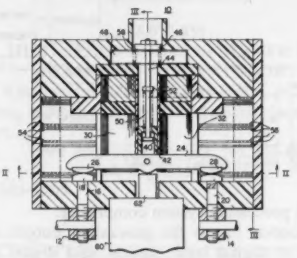
magnetic drive means comprising magnetizable material having a slot with one open end formed therein and being disposed around a portion of said fixed elongated contact arm and said movable elongated contact arm, with said fixed elongated contact arm being disposed toward the closed end of the slot and said movable elongated contact arm being disposed towards the open end of the slot; and

means connected to said elongated contact arms for conducting circuit current therethrough, said circuit current flowing in opposite directions through said fixed elongated contact arm and said movable elongated contact arm.

4,077,026
INTEGRAL MOTOR CONTROLLER

Paul G. Slade, Pittsburgh, and John A. Wafer, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 587,791, Jun. 16, 1975, abandoned.
This application Feb. 23, 1977, Ser. No. 771,288
Int. Cl.[2] H01H 77/10
U.S. Cl. 335—195 **19 Claims**



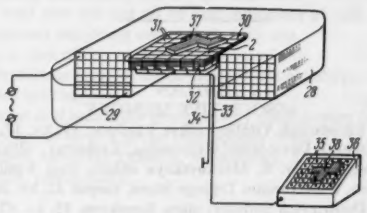
1. An integral motor controller comprising:
a housing;
a movable bridging contact arm;
means mounted within said housing for supporting said movable bridging contact arm in a manner so as to permit rectilinear movement thereof;
a pair of movable contacts spaced apart on said movable bridging contact arm;
a pair of stationary contacts spaced apart and supported by said housing in alignment with said pair of movable contacts;
electromagnetic actuator means associated with said movable contact arm to move said movable contact arm from a closed position wherein said pair of stationary contacts engage said pair of movable contacts, to a first open position wherein said pair of stationary contacts are spaced apart from said pair of movable contacts, and from said first open position to said closed position, said electromagnetic actuator being adapted for electrical operation when current flow through the integral motor controller is in the normal range or is in a lower overload range having a predetermined upper current limit; and,
magnetic driving means supported by said housing and coupled to said movable contact arm for moving said movable contact arm from the closed position to a second open position when current flow through the integral motor controller lies in an upper overload range overlapping the predetermined upper current limit of the lower overload range.

4,077,027
METHOD OF ORIENTED FEEDING OF NONMAGNETIC CURRENT-CONDUCTING COMPONENTS AND DEVICES FOR EFFECTING SAME

Benyamin Alexandrovich Ioffe, ulitsa Stirnu 37a, kv. 44; Robert Karlovich Kalnin, ulitsa Gorkogo 53, kv. 19; Jury Arvidovich Zommer, ulitsa Artilerias 52, kv. 25; Yanis Ekabovich Graubin, prospekt Mezha, 10, kv. 2; Eduard Prokofievich Davydenko, ulitsa Ierikju, 29, kv. 40, and Ivan Ivanovich Kern, ulitsa Auglju, 4, kv. 1, all of Riga, U.S.S.R.

Filed Jan. 17, 1977, Ser. No. 759,993
Int. Cl.[2] H01F 7/10
U.S. Cl. 335—219 **16 Claims**

1. A method of oriented feeding of nonmagnetic current-conducting components, residing in that: an alternating magnetic field is set up, whose induction vector is normal to the desired direction of feeding; a component is introduced into said magnetic field; at least one closed current-conducting loop is secured in said magnetic field so that its plane is normal to the induction vector of said magnetic field and offset with respect to the geometrical centre of said component in the desired direction of feeding; said oriented feeding is effected under the action of the electrodynamic forces appearing in said

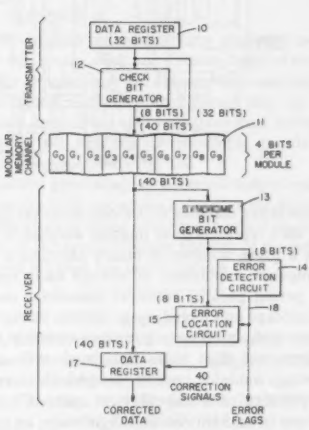


alternating magnetic field as a result of interaction of the overlapping current circuits induced by said magnetic field in said component and said closed current-conducting loop.

4,077,028
ERROR CHECKING AND CORRECTING DEVICE

Albert S. Lui, and Majid Arbab, both of San Diego, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 14, 1976, Ser. No. 695,494
Int. Cl.[2] G06F 11/12
U.S. Cl. 340—146.1 AL **10 Claims**



1. A system for providing single error correction, double error detection, and group error detection in a code word having plural groups of information and check bits, which comprises:
generator means receiving said code word for generating a plurality of syndrome bits,
first circuit means coupled to the output of said generator means for generating a first error signal if the informational content of said syndrome bits indicates a detection of any error in the transmission of said code word,
second circuit means coupled to the output of said generator means for generating a second error signal if the informational content of said syndrome bits indicates a detection of two random errors in said code word or an even number of errors in one of said plural groups,
third circuit means coupled to the output of said generator means for generating a third error signal if the informational content of said syndrome bits indicates a detection of an odd number of errors greater than one in one of said plural groups, and
error location circuit means in electrical communication with said generator means and said first, said second, and

said third circuit means for providing an error correction in response to the detection of a single error in said code word.

4,077,029

ASSOCIATIVE MEMORY

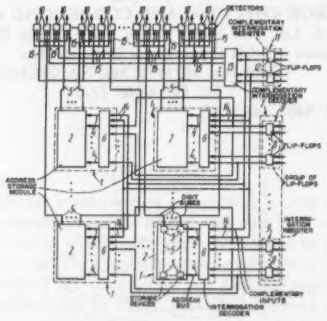
Georgy Viktorovich Vitaliev, ulitsa Vavilova, 39, kv. 17, Moscow; Alexei Davidovich Gvinepadze, Ljubertsy, ulitsa Lva Tolstogo, 27, kv. 8, Moskovskaya oblast; Rem Vasilievich Smirnov, 3 mikroraion Teplogo Stana, korpus 32, kv. 36, and Gury Dmitrievich Sofiisky, ulitsa Kazakova, 18, kv. 67, both of Moscow, all of U.S.S.R.

Filed Feb. 11, 1976, Ser. No. 657,063

Claims priority, application U.S.S.R., Feb. 13, 1975, 2104774

Int. Cl.[2] G11C *15/00, 8/00*

U.S. Cl. 365—49 **7 Claims**



1. An associative memory to perform retrieval operations on descriptor data represented as multibit associative words that are sets of a given number of binary associative descriptors which comprises: a plurality of storage units arranged in a matrix to permit parallel retrieval operations on descriptor data, each storage unit including an address storage module to record, store and access descriptor data stored in said storage units; address and digit buses associated with each of said address storage modules, each of said address storage modules having a plurality of storage devices each of which is connected to one of said address and digit buses; an interrogation decoder in each storage unit to drive said address storage modules by means of said address buses; an interrogation register to receive and store the interrogation code represented by a given set of binary descriptors and having a plurality of flip-flops each having inputs and outputs, said outputs of said flip-flops being electrically connected to said inputs of said respective interrogation decoders; a plurality of detectors to indicate the position of data having the given set of binary descriptors;

a complementary interrogation decoder to drive the respective detectors and having inputs and outputs, said inputs of said detectors being connected to said digit buses, and said detectors having complementary inputs electrically connected to said outputs of said complementary interrogation decoder; and a complementary interrogation register to receive and store the complementary interrogation code represented by a complementary set of binary descriptors and having a plurality of flip-flops having inputs and outputs, said outputs of said flip-flops being connected to the respective inputs of said complementary interrogation decoder and to complementary inputs of said interrogation decoders.

4,077,030

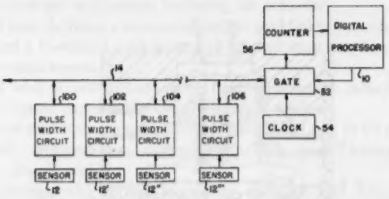
SENSOR DATA INPUT BY MEANS OF ANALOG TO PULSE WIDTH-TO DIGITAL CONVERTER

Uuno Vilho Helava, Southfield, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 19, 1976, Ser. No. 659,386

Int. Cl.[2] H03K *13/20*; G08C *15/06*

U.S. Cl. 340—183 **29 Claims**



1. A digital processing system comprising:

digital processor means for generating output signals in response to digital input signals, said digital processor means further including means for generating interrogation signals in the form of a transition between a pair of signal levels which are significantly different;

at least two sensor means disposed at remote locations for generating analog signals having a value indicative of sensed inputs;

first pulse width converter means disposed at one of said remote locations and receiving analog signals from one of said sensor means for generating a first pulse width signal in response to each of said interrogation signals, said first pulse width signal formed by a transition between said same pair of signal levels and having a pulse width indicative of the value of the analog signal received from said one sensor means;

second pulse width converter means disposed at the other remote locations and receiving analog signals from the other of said sensor means for generating second pulse width signal a predetermined time after the occurrence of each interrogation signal, said second pulse width signal formed by a transition between said same pair of signal levels and having a pulse width indicative of the value of the analog signal received from said other sensor means;

digital converter means interfacing said digital processor and receiving the pulse width signals from said first and second pulse width converter means and said interrogation signals for generating digital data for said digital processor means, said digital data indicative of the pulse width of the received pulse width signals; and

a single bi-directional data transmission line for transmitting said interrogation and said pulse width signals between said first and second pulse width converter means and said digital converter means;

wherein said first and second pulse width converter means each comprises:

bi-stable means switchable between two stable states for switching to a first state and generating a first signal having a signal level the same as one of said pair of signal levels in response to said interrogation signals and for switching to a second state and generating a second signal having a signal level the same as the other of said pair of signal levels in response to a reset signal, wherein said first signal is said pulse width signal;

means enabled by said first signal and disabled by said second signal for integrating the analog signal generated by said sensor means to generate an integrated signal having a value proportional to the value of said analog signal and the time of integration;

means enabled by said first signal for generating said reset signal each time said integrated signal exceeds a predetermined value; and

pulse width signal isolation means interfacing said bi-direc-

tional data transmission line for isolating said bi-stable means from the signals on said bi-directional data transmission line for a predetermined interval after receiving said interrogation signal; and

wherein said second pulse width converter means further includes:

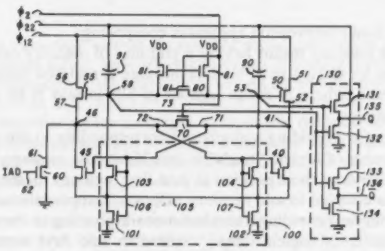
delay means for delaying for said predetermined time the switching of said bi-stable means to said first state in response to said interrogation signals.

4,077,031

HIGH SPEED ADDRESS BUFFER FOR SEMICONDUCTOR MEMORY

Norihisa Kitagawa, and Lionel Stuart White, Jr., both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 23, 1976, Ser. No. 716,843
Int. Cl.[2] G11C *8/00*
U.S. Cl. 365—205 **18 Claims**



1. A memory system of the type having an array of memory cells selectively addressed by row and column signals, said signals being generated from row and column address buffers, said buffers including a plurality of flip-flops, said flip-flops including a pair of cross-coupled transistors having set and reset nodes, said set node being coupled to a first load transistor for charging said set node at a rate proportional to the potential on a set control node, said reset node being coupled to a second load transistor for charging said reset node at a rate proportional to the potential on a reset control node, the improvement comprising:

a. equalizing means for equalizing the voltage of said set and reset nodes;

b. precharge means for applying a precharge to said set control node and said reset control node;

c. means for generating a voltage difference between said set node and said reset node in response to an input address signal; and

d. current sinking means for sensing a voltage difference between said set node and said reset node and for selectively sinking said precharge from one of said control nodes in response thereto.

4,077,032

ELECTRONIC DISPLAY APPARATUS

Alan Volkman, 5331 Baltimore Ave., Chevy Chase, Md. 20015

Filed Jan. 7, 1976, Ser. No. 647,186
Int. Cl.[2] G04C *17/02*
U.S. Cl. 340—324 R **16 Claims**

1. A display assembly, comprising:

a substrate;

a plurality of optically variable indicators on said substrate arranged in an array, said indicators being grouped in first and second sets in said array;

means for driving a first sub-set of said first set of indicators to form a visually discernable pointer having a first shape and representing a first measured parameter;

means for driving a second sub-set of said second set of indicators to form a visually discernable pointer having a second shape and representing a second measured parameter;

said first and second shapes being such that they are separately discernable when superimposed;

at least one but not all of said indicators of said first and second sets being common to both sets.

13. A day of the week display, comprising:

a rectilinear array of seven electro-optical indicators having no indicia;

five of said indicators being equally spaced apart from each other to form a group representing from left to right the days Monday, Tuesday, Wednesday, Thursday and Friday, respectively;

the remaining two indicators being disposed one on each side of said group, each at a distance from its next adjacent indicator greater than the distance between the indicators of said group such that said group may be separately discerned apart from said remaining two indicators, said remaining two indicators representing the days Sunday and Saturday, respectively; and

a clock circuit generating an electrical output each day and cooperating with said seven indicators for driving each of said indicators in timed sequence to effect an indication of the day of the week whereby the day of the week may be displayed without the use of indicia.

4,077,033

PLASMA DISPLAY DRIVE CIRCUIT AND METHOD

Richard Albert Strom, Eagan, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Sep. 13, 1976, Ser. No. 722,948
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M **13 Claims**

1. Apparatus for driving a plasma display panel of a type having a plurality of drive electrodes comprising a first group and a second group of drive electrodes in generally orthogonal relationship to said first group in matrix arrangement and in which orthogonal pairs of said drive electrodes uniquely specify all display elements in the panel, said apparatus comprising:

selection control logic apparatus for producing selection signals for selectively addressing predetermined display elements,

first sustain drive apparatus for said first group of drive electrodes comprising switches for selectively applying either a sustain amplitude voltage or a dual-on-state erase amplitude voltage to a first output and switches for selectively applying either a write amplitude voltage or a ground return voltage to a second output,

second sustain drive apparatus for said second group of drive electrodes comprising switches for selectively applying either a sustain amplitude voltage or a dual-on-state erase amplitude voltage to a second output and switches for selectively applying either a write amplitude voltage or a ground return voltage to a second output,

means including a fast recovery diode, for connecting each

drive electrode of said first group to said second output of said first sustain drive apparatus,

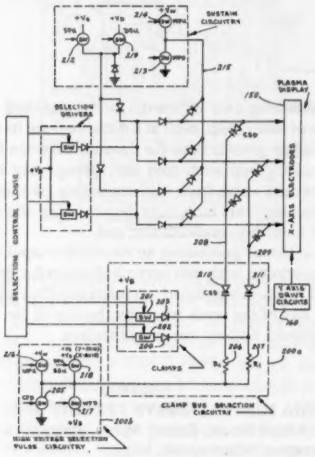
means including a fast recovery diode, for connecting each drive electrode of said second group to said second output of said second sustain drive apparatus,

first means, including selection drivers and fast recovery diodes in matrix interconnection, for selectively connecting each drive electrode of said first group to said first output of said first sustain drive apparatus,

second means, including selection drivers and fast recovery diodes in matrix interconnection, for selectively connecting each drive electrode of said second group to said first output of said second sustain drive apparatus,

a plurality of charge storage diodes, at least one connected to each drive electrode of said first group and of said second group,

a plurality of first clamp bus selection means for matrix interconnection to said charge storage diodes connected to the drive electrodes of said first group, each of said means being connected to at least two of said charge storage diodes, and wherein each of said clamp bus selection means comprises a charge storage diode and current limiting resistor connected in series with a low voltage



clamp connected to the junction of said charge storage diode and resistor.

a plurality of second clamp bus selection means for matrix interconnection to said charge storage diodes connected to the drive electrodes of said second group; each of said means being connected to at least two of said charge storage diodes and wherein each of said clamp bus selection means comprises a charge storage diode and current limiting resistor connected in series with a low voltage clamp connected to the junction of said charge storage diode and resistor,

a first high voltage selection pulse circuit means, connected to each of said current limiting resistors of said first clamp bus selection means, said selection pulse circuit means being selectively operable to have as an output a write amplitude voltage, a ground return voltage, or a sustain amplitude voltage, and

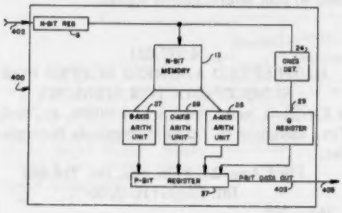
a second high voltage selection pulse circuit means, connected to each of said current limiting resistors of said second clamp bus selection means, said selection pulse circuit means being selectively operable to have as an output a write amplitude voltage, a ground return voltage, selective erase amplitude voltage, or a sustain amplitude voltage.

4,077,034

DATA COMPRESSION

Harold R. Dell, 4125 Sutherland Drive, Palo Alto, Calif. 94303

Filed Nov. 4, 1974, Ser. No. 520,431
Int. Cl.[2] H03K *13/24*
U.S. Cl. 340—347 DD **18 Claims**



1. A data compression apparatus comprising:

a first memory means having a plurality of memory cells;

means for storing an N-bit data message in said first memory means, where N is the number of bits in said N-bit data message;

means for providing a number Q corresponding to the total number of logical "one's" in said N-bit data message irrespective of their position in said first memory means;

means coupled to said memory cells in a first predetermined order for providing a number A corresponding to the total number of logical "one's" stored in said first memory means according to a first predetermined sequence;

means coupled to said memory cells in a second predetermined order which is different from said first predetermined order for providing a number B corresponding to the total number of logical "one's" stored in said first memory means according to a second predetermined sequence;

means coupled to said memory cells in a third predetermined order which is different from both said first and said second predetermined order for providing a number C corresponding to the total number of logical "one's" stored in said first memory according to a third predetermined sequence;

means for providing a P-bit message having an A, B, C and Q segment corresponding to said numbers A, B, C and Q, respectively, where P is the number of bits in said P-bits message;

a second memory means responsive to said Q segment of said P-bit data message for storing Q logical "one's" in said second memory means;

means for providing a number A′ corresponding to the total number of logical "one's" stored in said second memory means according to a first predetermined sequence;

means for providing a number B′ corresponding to the total number of logical "one's" stored in said second memory means according to a second predetermined sequence;

means for providing a number C′ corresponding to the total number of logical "one's" stored in said second memory means in a third predetermined sequence;

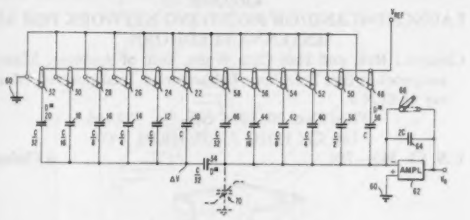
means for comparing predetermined pairs of said numbers, A′ and A, B′ and B and C′ and C, said comparing means including means for providing an output signal corresponding to the numerical relationship between each of said pairs; and

means responsive to said output signal, in the event said numerical relationship is one of inequality, for reordering the position of logical "one's" in said second memory means until said numerical relationship between each of said number pairs is one of equality.

4,077,035
TWO-STAGE WEIGHTED CAPACITOR CIRCUIT FOR ANALOG-TO-DIGITAL AND DIGITAL-TO-ANALOG CONVERTERS

Yen Sung Yee, White Plains, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 10, 1976, Ser. No. 685,201
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 DA **7 Claims**



1. A two-stage weighted capacitor signal conversion circuit comprising a first network of capacitors including a plurality of n/2 capacitors, said capacitors having decreasing fractional values from $C/2^{\circ}$ to $C/2^{(n/2-1)}$ where n is an integer,

an amplifier means including an input and output lead and a feedback capacitor connected between said input and output leads and wherein one side of each of said capacitors of said first network is connected to said amplifier input lead at a first node,

a second network of capacitors including a plurality of n/2 capacitors, said capacitors having decreasing fractional values from $C/2^{\circ}$ to $C/2^{(n/2-1)}$, one side of each of said capacitors of said second network being connected together at a second node,

a coupling capacitor of value $C/2^{(n/2-1)}$ connected between said first and second node,

a plurality of n switches, each switch connected to the other side of a separate one of said n capacitors of said first and second networks, said switches being adapted to be selectively connected to at least a first reference potential and a second reference potential,

wherein said amplifier means functions to maintain said first node constantly fixed at said second reference potential and wherein said plurality of switches are selectively actuated in accordance with a digital signal representation to establish electrical paths through said capacitors connected thereto to provide an analog signal on the otput lead of said amplifier means which is an analog representation of said digital signal representation.

4,077,036
DATA ENTRY DEVICES

Emik A. Avakian, 17 Stoney Brook Drive, Glastonbury, Conn. 06033, and David Laizerovich, West Hartford, Conn., assignors to Emik A. Avakian, Glastonbury, Conn.

Filed Aug. 30, 1976, Ser. No. 718,982
Int. Cl.[2] G08C *1/00*; H01H *9/00*
U.S. Cl. 340—365 S **26 Claims**

1. Manually operable apparatus for generating signals commensurate with information to be transmitted to other equipment, said signal generating apparatus comprising:

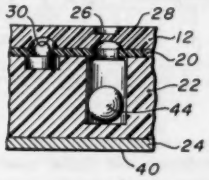
switch matrix means, said switch matrix means including:

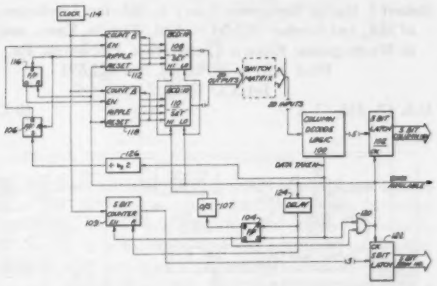
a circuit defining element, said circuit defining element being provided with a pattern of apertures and supporting a plurality of conductors, said conductors being arranged so as to at least in part intercept at least some of said apertures in pairs whereby each of said intercepted apertures may be identified by a unique pair of conductors;

base means, said base means defining a plurality of receptacles having a generally circular cross-section, said base means being juxtapositioned to a first side of said circuit defining element with said receptacles arranged coaxially with said apertures and facing said circuit defining element; and

a spherical conductive member disposed in each of said base means receptacles, said conductive members having a diameter less than the diameter of said receptacles whereby said conductive members are freely movable in said receptacles;

protective cover means, said cover means having a first surface juxtapositioned to and generally coplanar with the second side of said circuit defining element, said cover means having a second surface which defines a data input area, said cover means second surface forming at least part of an exposed face of said housing; and





means for actuating the switches of said matrix means, said conductive members being caused to move by magnetic attraction into contact with a pair of intercepting conductors to bridge said conductors when said actuating means is aligned with the circuit defining element aperture with which said conductors are associated.

23. The apparatus of claim **1** further comprising:

encoding means for generating a unique binary bit pattern for each unique pair of conductors on said switch matrix circuit defining element, said encoding means being electrically connected to said conductors on said circuit defining element.

4,077,037
VARIABLE RANGE MARKER

Joseph E. Bryden, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Aug. 6, 1976, Ser. No. 712,428
Int. Cl.[2] G01S *7/22*
U.S. Cl. 343—5 EM **6 Claims**

4. A radar system comprising in combination:

means for producing digital representations of a radar return signal;

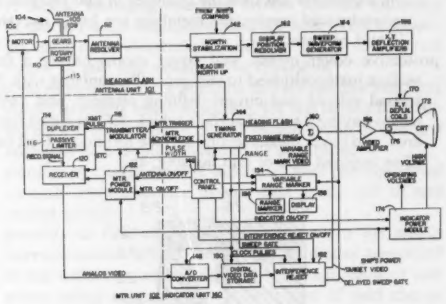
means for storing said representations;

means for reading out said representations from said storing means at a rate which is substantially constant among at least some settings of a radar range scale setting;

means for producing a video signal from the read out representations;

means for producing a variable position range mark signal, said range mark signal modifying said video signal;

means for producing a digital number to generate said variable range mark signal at a distance from the center of said manual display;



a continuously rotatable control; and

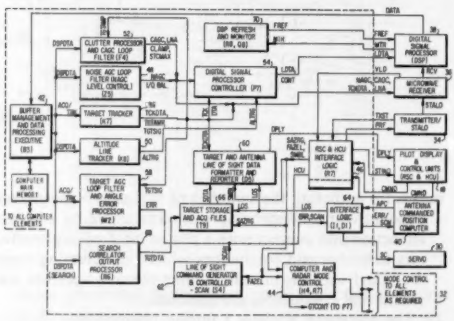
means for producing said digital number in response to manual rotation of said rotatable control.

4,077,038

DIGITAL RADAR CONTROL SYSTEM AND METHOD

Robert I. Heller, Baltimore; Larry C. Schafer, Linthicum, both of Md., and Stephen R. McCracken, Wichita, Kans., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 1, 1976, Ser. No. 672,891
Int. Cl.[2] G01S 7/44
U.S. Cl. 343—7 A **18 Claims**



1. In an aircraft pulsed doppler radar system including a wave energy transmitter and a receiver for detecting the wave energy returned to the receiver by reflection, a digital system, including a programmed digital computer, for processing the returned energy comprising:

means for determining the range from which said return energy is reflected to provide digital range data, and for evaluating the width of said return energy in the time domain;

means for evaluating the amplitude of said return energy, and for designating said return energy as clutter and generating clutter AGC and blanking signals for control of the receiver in response to an evaluated width and amplitude of said return energy above predetermined minimum values;

means for designating said return energy as an altitude line and for tracking said altitude line designated return energy in response to a predetermined number of detections of said return energy at about the same range over a predetermined period of time, said altitude line designating and tracking means having a tracking loop response sufficient to account for changes in terrain beneath the aircraft and for sudden range changes of short duration; and,

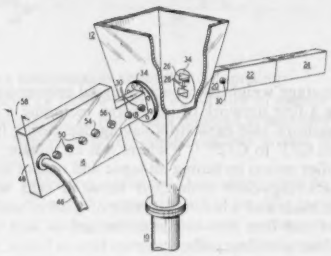
means for designating said return energy as a target and for tracking said target designated return energy in response to said range determining means, said amplitude determining means and an evaluated width of said return energy below said predetermined value.

4,077,039

LAUNCHING AND/OR RECEIVING NETWORK FOR AN ANTENNA FEEDHORN

Chung-Li Ren, and Han-Chiu Wang, both of Andover, Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 20, 1976, Ser. No. 752,165
Int. Cl.[2] H01Q 13/00; H03H 9/00
U.S. Cl. 343—786 **6 Claims**



6. Apparatus for an antenna for either launching or receiving two orthogonally polarized signals in a first frequency band, the antenna comprising a flared feedhorn and a waveguide transmission line which will support signals in a second frequency band, the apparatus comprising:

a first network oriented to either launch or receive a first one of the two orthogonally polarized signals comprising

a first evanescent mode waveguide filter coupled at a first end thereof to a first sidewall of the flared portion of the feedhorn through a T-junction and at a second end thereof to a waveguide section capable of propagating signals at the first frequency band, said first waveguide filter being dimensioned and tunable to pass the first frequency band signals and to have a very broad stopband for the second frequency band signals, and

a second evanescent mode waveguide filter coupled at a first end thereof to a second sidewall of the flared portion of the feedhorn through a T-junction at a location directly opposite and facing said first waveguide filter and at a second end thereof to a load termination, said second waveguide filter having the same filter characteristics as said first waveguide filter; and

a second network oriented to either launch or receive a second one of the two orthogonally polarized signals comprising

a first evanescent mode waveguide filter coupled at a first end thereof to a third sidewall of the flared portion of the feedhorn through a T-junction and at a second end thereof to a waveguide section capable of propagating signals at the first frequency band, said first waveguide filter being dimensioned and tunable to pass the first frequency band signals and to have a very broad stopband for the second frequency band signals, and

a second evanescent mode waveguide filter coupled at a first end thereof to a fourth sidewall of the flared portion of the feedhorn through a T-junction at a location directly opposite and facing said first waveguide filter and at a second end thereof to a load termination, said second waveguide filter having the same filter characteristics as said first waveguide filter.

4,077,040

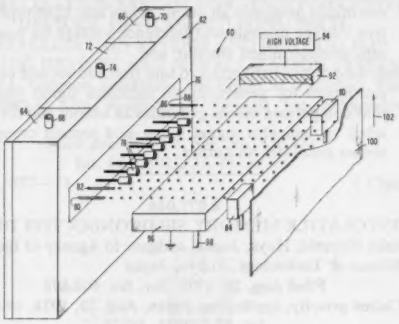
GUARD JETS IN MULTIPLE NOZZLE PRINTING

Ferdinand Hendriks, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 591,984, Jun. 30, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,780

Int. Cl.[2] G01D *15/18*

U.S. Cl. 346—75 6 Claims



1. In a jet printer, the combination comprising:

a multiple nozzle array having at least one row of nozzles, with N nozzles in said one row; and

means for emitting a non-marking droplets stream from at least the first and Nth nozzles for creating a colinear airflow, including means for emitting a marking droplet stream from each of the other nozzles, with the airflow created by the emitted non-marking droplet streams being used to reduce the aerodynamic retardation of the emitted marking droplet streams.

4,077,041

PHOTOGRAPHIC CAMERA EMPLOYING A CARTRIDGE FILM

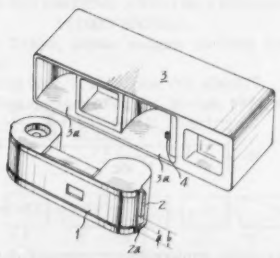
Toshinori Imura, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 24, 1976, Ser. No. 670,025

Claims priority, application Japan, Apr. 1, 1975, 50-40000

Int. Cl.[2] G03B *7/00*

U.S. Cl. 354—21 11 Claims



1. The combination comprising a camera having photographing parameters based on a film having a predetermined sensitivity and having a film cartridge housing cavity and a cavity cover movable between cavity open and cavity closed positions, a film cartridge insertable into said cavity and having index means in accordance with the sensitivity of the film carried by said cartridge, means for sensing said indexing means communicating with said cavity and control means responsive to the relationship between said sensing means and the index means of an inserted cartridge to alternatively permit or prevent the closing of said cover when said index means designates a film with a sensitivity range which covers or is outside said predetermined sensitivity respectively.

4,077,042

CONTROL MEANS FOR PHOTOFLASH PHOTOGRAPHY SYSTEM

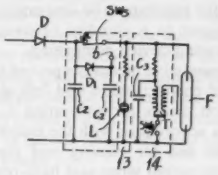
Toshinori Imura, Sakai; Keisuke Maeda, Osaka, and Mikio Naya, Izumi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

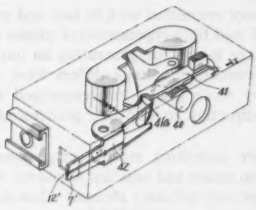
Filed Jul. 8, 1976, Ser. No. 703,490

Claims priority, application Japan, Jul. 11, 1975, 50-85685

Int. Cl.[2] G03B *7/00, 15/05*

U.S. Cl. 354—21 8 Claims





1. A photoflash photography apparatus comprising a camera having a film cartridge receiving chamber, a film cartridge replaceably housed in said chamber and having detectable indicia varying in accordance with the sensitivity of the film contained in said cartridge, a photoflash unit coupled to the camera and having a variable light output and including a photoflash tube and at least a pair of storage capacitors dischargable through said tube to effect the emission of said photoflash light therefrom and control means responsive to said indicia for varying the amount of the light emittted from said photoflash unit inversely of the sensitivity of said film contained in said cartridge and including means for alternatively connecting one and both of said capacitors across said tube in response to said indicia.

4,077,043

EXPOSURE INDICATING DEVICE

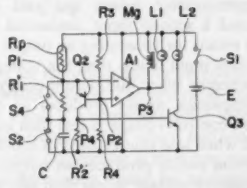
Yasuhiro Nanba, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1976, Ser. No. 709,528

Claims priority, application Japan, Aug. 2, 1975, 50-94524

Int. Cl.[2] G03B *7/08, 17/18*

U.S. Cl. 354—51 22 Claims



1. In a photographic camera including an automatic expo-

sure control device having a photoelectric means for generating an output representative of the scene brightness, exposure control means connected to said photoelectric means for generating an exposure control voltage in accordance with the output of said photoelectric means, reference voltage means for generation of a reference voltage, a comparison means, having a first input terminal connectable to said exposure control means and a second terminal connected to said reference voltage means for generating an output when said exposure control voltage reaches said reference voltage, electromechanical means connected to said comparison means for control of film exposure in response to the output of said comparison means, and an exposure indicating means for indicating by actuation and deactuation of at least one indicator element what relation the exposure to be determined automatically will have with respect to a plurality of standards, an improved exposure indicating device comprising:

a light-representative means connected to said photoelectric means and connectable to said first input terminal of said comparison means for generating a light-representative voltage in accordance with the output of said photoelectric means and for causing said comparison means to generate an output when said light-representative voltage differs from the reference voltage in one predetermined direction;

a first transistor connected with its base and emitter between outputs of said light-representative means and said reference voltage means for generating an output when said light-representative voltage differs from said reference voltage by more than a predetermined amount in the opposite direction to said one predetermined direction; and

said exposure indicating means being connected to said comparison means and said first transistor for actuation of said at least one indicator element when said comparison means generates an output and for actuation of said at least one indicator element when said first transistor generates an output.

17. An improvement in an exposure indicating device for automatic exposure control photographic cameras comprising:

photoelectric means for generating an output representative of the scene brightness;

exposure control means for generating exposure control voltage when connected with said photoelectric means;

light-representative means for generating light-representative voltage when connected with said photoelectric means;

shutter control means for starting film exposure sequence;

selector means interconnected with said shutter control means, said photoelectric means, said exposure control means and said light-representative means, for alternatively connecting said exposure control means and said light-representative means to said photoelectric means in response to said shutter control means, whereby said exposure control means is connected to said photoelectric means when said shutter control means is activated and said light representative means is connected to said photoelectric means when said shutter control means is deactivated;

reference voltage means for generating a reference voltage;

first comparison means with a first input connected to said light-representative means and said exposure control means and a second input connected to said reference voltage means for generating an output when the voltage at said first input is less than the voltage on said second input, whereby when said shutter control is activated said first comparison means produces an output when said exposure control voltage is less than said reference voltage and when said shutter control is deactivated said first comparison means produces an output when said light-representative voltage is less than said reference voltage;

electromechanical means connected to said first comparison means and said shutter control means, for control of film exposure when said shutter control means is activated and said first comparison means generates an output;

second comparison means with a first input connected to said light-representative means and said exposure control means and a second input connected to said reference voltage, for generating an output when the voltage on said first input exceeds the voltage on the second input by more than a predetermined amount, whereby when said shutter control means is deactivated said second comparison means generates an output when said light-representative voltage exceeds said reference voltage by more than said predetermined amount; and

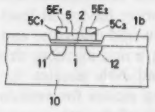
indicator means connected to said first and second comparison means for generating an indicator signal when said first comparison means generates an output and for generating an indicator signal when said second comparison means generates an output.

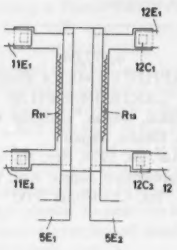
4,077,044

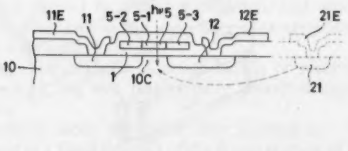
NONVOLATILE MEMORY SEMICONDUCTOR DEVICE

Yutaka Hayashi, Hoya, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Aug. 28, 1975, Ser. No. 608,676
Claims priority, application Japan, Aug. 29, 1974, 49-98418
Int. Cl.[2] H01L *29/78*
U.S. Cl. 357—23 **14 Claims**







1. A nonvolatile semiconductor memory device with analogue information storage capability, comprising:

a semiconductor substrate of a first conductivity type;

at least two spaced apart regions in the substrate and of opposite conductivity type to the substrate, the regions defining a channel-forming region in the substrate;

an insulating layer disposed on the substrate at least about the channel-forming region;

charge-storing means disposed in the insulating layer and at least above the channel-forming region;

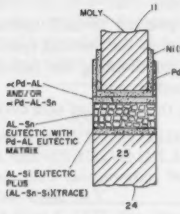
a gate disposed on the insulating layer above the channel-forming region, the gate comprising an elongated resistive layer; and

a first pair of electrodes, one of the electrodes contacting one side of the resistive layer for supplying a voltage varying according to analogue information to be stored in the device and the other electrode contacting the opposite side of the resistive layer.

4,077,045
METALLIZATION SYSTEM FOR SEMICONDUCTIVE DEVICES, DEVICES UTILIZING SUCH METALLIZATION SYSTEM AND METHOD FOR MAKING DEVICES AND METALLIZATION SYSTEM

Richard L. Greeson, Scottsdale, and Elliott M. Philofsky, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 3, 1974, Ser. No. 430,431
Int. Cl.[2] H01L *23/48, 29/46*
U.S. Cl. 357—71 **6 Claims**



1. A semiconductor device having a metallurgical bond between the semiconductor die and the terminals attached thereto comprising a semiconductor die,

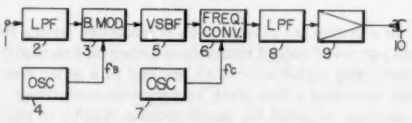
a metallization system on each side of said die comprising an aluminum layer on the die and a layer of aluminum and tin mixture on the aluminum layer,

terminals each comprising a metal slug of a material selected from the group consisting of molybdenum, copper, nickel, silver, platinum, palladium, rhodium tungsten, and copper clad steel on each side of said die and metallurgically bonded thereto, and a glass preform sealed to each of said metal slugs.

4,077,046
SYSTEM FOR RECORDING AND/OR REPRODUCING A VIDEO SIGNAL

Minoru Morio, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 7, 1975, Ser. No. 630,077
Claims priority, application Japan, Nov. 9, 1974, 49-129231
Int. Cl.[2] H04N *5/76*
U.S. Cl. 358—4 **18 Claims**



5. A system for magnetically recording a color video signal comprised of frequency components over a video band that include a luminance portion and a chrominance portion, said system comprising:

filter means to separate said luminance portion from said chrominance portion; modulating means to modulate a carrier with said luminance portion from said filter means for producing an amplitude or phase modulated signal that includes not substantially more than one sideband signal;

frequency converting means receiving said one sideband signal and said chrominance portion;

a source of at least one frequency converting signal applied to said frequency converting means for causing the latter to convert said sideband signal to a frequency range such that the carrier frequency of the converted sideband signal is substantially at the low frequency end of said converted sideband signal and is a lower frequency than at least some of said frequency components of the video band and further for causing said frequency converting means to convert said chrominance portion to a frequency range below said frequency range of the converted sideband signal;

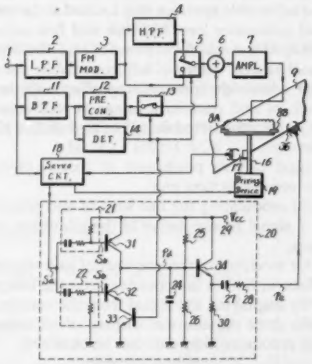
magnetic transducing means; and

means applying said converted sideband signal and said converted chrominance portion to said magnetic transducing means for recording by the latter in parallel abutting or overlapping tracks on a magnetic recording medium with the carrier of said converted sideband signal, as recorded in each of said tracks, being substantially aligned with the carrier of the converted sideband signal recorded in the adjacent tracks.

4,077,047
COLOR KILLER ENHANCEMENT IN A VIDEO SIGNAL RECORDING/PLAYBACK SYSTEM

Kazuo Yamagiwa, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 16, 1976, Ser. No. 705,798
Claims priority, application Japan, Jul. 21, 1975, 50-101075[U]
Int. Cl.[2] H04N *5/76*
U.S. Cl. 358—4 **16 Claims**

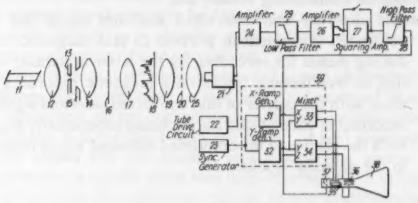


1. In an apparatus for recording and/or reproducing a video signal having a predetermined characteristic indicative of whether said video signal is a composite color video signal or a monochrome video signal, and in which said video signal is recorded on a magnetic medium by at least one rotary head; a mode control signal generating means for generating a mode control signal representative of said predetermined characteristic, and a fixed head receiving said mode control signal for recording the same on said magnetic medium.

4,077,048
OPTICAL DIFFRACTOMETERS

John Jungles, Thurmaston; David John Whitehouse, Melton Mowbray, and Eric Gordon Nightingale, Leicester, all of England, assignors to The Rank Organisation Limited, London, England

Continuation-in-part of Ser. No. 454,009, Mar. 22, 1969, Pat. No. 3,927,253. This application Apr. 24, 1975, Ser. No. 571,273
Claims priority, application United Kingdom, Mar. 22, 1973, 13831/73
Int. Cl.² H04M 5/72
U.S. Cl. 358—89 **13 Claims**



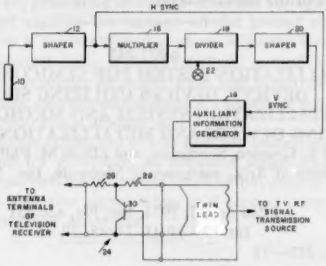
1. In an optical diffractometer system of the type comprising:
a laser as light source,
holder means for supporting an object,
an image transformation unit for providing a Fourier transform of an object carried by said object holder means, and
an image reconstruction unit including means for focusing an image transform at a transform plane and a reconstructed image at an image plane,
the improvement wherein:
said laser is a multimode device,
said image transformation unit includes
a condenser lens,
a first adjustable aperture stop positioned in the focal plane of said condenser lens, such that adjustments to the size of said aperture stop effect adjustments to said image transform quality,
a collimator lens from which substantially plane parallel light is directed towards an object carried by said object holder means, and
a second adjustable aperture stop located at the entrance pupil of said collimator lens, between said first adjustable aperture stop at the rear focal plane of said condenser lens and said collimator whereby adjustments to the size of said further adjustable aperture stop effect adjustments to one or both of said transform image at said transform plane and said reconstructed image at said image plane,
and there is:
a television camera positioned to receive light from said image reconstruction unit,
means for modulating the line scan of said television camera by a Y signal repesentative of the television camera beam current,
means for modulating the line scan of said television camera to effect an X-shift in dependence on the line position, and
means for displaying the signal from the camera, whereby a pseudo three dimensional display of an image from said image reconstruction unit can be obtained.

4,077,049
UNIVERSAL TELEVISION INTERFACE

Ralph H. Baer, Manchester, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Jan. 26, 1977, Ser. No. 762,539
Int. Cl.² H04N 7/18
U.S. Cl. 358—93 **16 Claims**

1. Apparatus for generating synchronization signals from an ongoing program received at a television receiver from a TV r.f. signal transmission source, comprising:
means adapted to be positioned proximate a television receiver for extracting a signal in synchronism with the horizontal synchronization signal received by the television receiver from the TV r.f. signal transmission source;

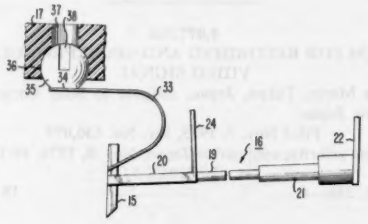


means electrically coupled to said extracting means for generating a signal at the vertical synchronization rate, including means for dividing the extracted signal by a predetermined number; and
means for changing the divisor of said dividing means.

4,077,050
VIDEO DISC PLAYER EMPLOYING A SPRING LOADED STYLUS APPARATUS

Anil Ramniklal Dholakia, East Windsor, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 16, 1976, Ser. No. 667,307
Claims priority, application United Kingdom, Sep. 15, 1975, 37848/75
Int. Cl.² G11B 17/06
U.S. Cl. 358—128 **7 Claims**



1. In a system for playing back prerecorded signals from a spirally-grooved record rotatably mounted on a turntable by a groove-riding stylus secured to one end of a stylus arm; said system including a base plate; an apparatus comprising:
a carriage mounted for lateral motion relative to said base plate in correlation with lateral motion of said groove-riding stylus;
means for supporting the end of said stylus arm remote from said one end within said carriage;
a spring for urging said stylus into said record groove during playback; said spring having a first end and a second end; said first end of said spring being secured to said stylus; and
means for securing said second end of said spring within said carriage for movement therewith.

4,077,051

VIDEO DISC WITH A CONDUCTIVE LAYER HAVING AN OXYGEN CONTENT GRADIENT

John Louis Vossen, Jr., Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 4, 1977, Ser. No. 793,640
Int. Cl.[2] H04N *1/28;* B32B *3/02, 15/08, 15/20*
U.S. Cl. 358—128 10 Claims

1. A capacitive recording means comprising:

a. a disc having a spiral groove on a surface thereof with video information in the form of geometric variations in said groove;

b. a thin conductive bilayer film disposed on said surface of the disc having a first layer of copper and a second layer of an alloy of nickel and chromium which contains up to about 10% by weight of iron; and

c. a polymeric dielectric layer disposed on the conductive film

wherein the alloy layer contains from about 5 to about 20 average atomic percent of oxygen and the oxygen content forms a concentration gradient decreasing from the interface between the copper layer and the alloy layer to the interface between the alloy layer and the polymeric dielectric layer.

4,077,052

VIDEO DISC CAPACITIVE RECORDING MEANS WITH A CONDUCTIVE BILAYER

John Louis Vossen, Jr., Bridgewater, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 4, 1977, Ser. No. 793,644
Int. Cl.[2] H04N *1/28;* B32B *3/02, 15/08, 15/20*
U.S. Cl. 358—128 11 Claims

1. A capacitive recording means comprising:

a. a disc having a spiral groove on a face thereof with video information in the form of geometric variations in said groove;

b. A thin conductive bilayer film on said face having a first layer of copper and a second layer of an alloy of nickel and chromium which contains up to about 10% by weight of iron and contains from about 5 to about 25 average atomic percent of oxygen; and

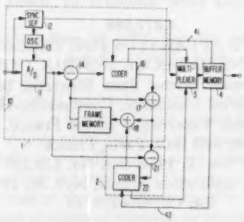
c. an inorganic dielectric layer disposed on said conductive film.

4,077,053

TELEVISION SIGNAL ENCODER UTILIZING A CORRELATION BETWEEN FRAMES

Tatsuo Ishiguro, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Apr. 8, 1976, Ser. No. 674,998
Claims priority, application Japan, Apr. 9, 1975, 50-43591
Int. Cl.[2] H06N *7/12*
U.S. Cl. 358—136 6 Claims



1. A system for coding a television signal by the use of a frame correlation technique, said television signal consisting of a series of frames each defined by horizontal and vertical synchronizing signals and each representing a number of two-dimensionally arranged picture elements of an optical image to be transmitted, said coding system comprising:

means for sequentially comparing every two successive frames to produce an interframe-coded signal;

means responsive to said interframe-coded signal and said television signal for obtaining an interframe-coding error signal caused in said comparing means;

means for coding said interframe-coding error signal to produce an intraframe-coded signal; and

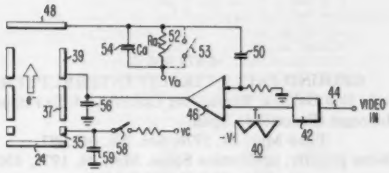
means for multiplexing said intraframe-coded signal with said interframe-coded signal.

4,077,054

SYSTEM FOR MODULATING A FLAT PANEL IMAGE DISPLAY DEVICE

John Guiry Endriz, Trenton, NJ, assignor to RCA Corporation, New York, N.Y.

Filed Feb. 17, 1977, Ser. No. 769,653
Int. Cl.[2] H04N *5/68*
U.S. Cl. 358—242 11 Claims



11. A method for modulating an electron beam in a display device having a cathodoluminescent screen, comprising:

generating a periodic waveform having a peak amplitude which varies proportionally with the incoming video signal;

sensing the electrical charge on the screen;

generating a voltage proportional to the sensed instantaneous charge;

comparing the voltage proportional to the sensed charge to the instantaneous voltage of the periodic waveform; and

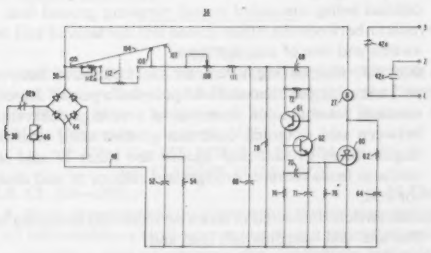
regulating the electron flow proportionally in response to the comparison of the two voltages.

4,077,055

GROUND FAULT PROTECTIVE DEVICE

John T. Wilson, and James P. Ellsworth, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jun. 15, 1976, Ser. No. 696,325
Int. Cl.[2] H02H *3/28*
U.S. Cl. 361—46 7 Claims



1. Apparatus for protecting power distribution circuits from ground fault damage, comprising:

a current monitor providing an output signal in response to ground fault current flow in a circuit being protected;

electrical switching means for controlling an associated circuit interrupter;

electronic circuit means connected to said current monitor and said electrical switching means for actuating said switching means upon receipt of an output signal from said current monitor, said circuit means comprising a mechanical switch for altering parameters of said circuit; and

an interchangeable rating plug removably connected to said electronic circuit means, said plug determining the level of ground fault current required to actuate said switching means and comprising a resistor, means for electrically connecting said resistor to said electronic circuit means, and means for mechanically actuating said switch when said rating plug is connected to said electronic circuit means, whereby parameters of said electronic circuit are adjusted.

4,077,056

GROUND-FAULT CIRCUIT INTERRUPTER

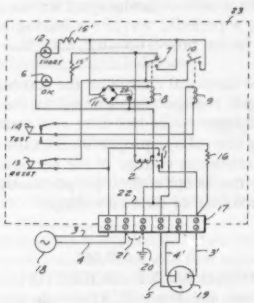
Antonio Bou Galiana, Rambla del Caudillo, 54, San Baudilio de Llobregat (Barcelona), Spain

Filed Mar. 24, 1976, Ser. No. 669,987

Claims priority, application Spain, Mar. 26, 1975, 436102

Int. Cl.[2] H02H *3/16*

U.S. Cl. 361—50 **9 Claims**



1. A ground-fault circuit interrupter for connection between incoming hot, cold, and ground lines and outgoing hot, cold, and ground lines, said interrupter comprising:

a test switch having a pair of test contacts and a pole normally lying against one of said test contacts, said one test contact being connected to said outgoing ground line;

a resistor between the other of said test contacts of said test switch and one of said hot lines;

a detector relay having a detector coil connected between said outgoing cold line and said pole and a pair of detector contacts actuatable on detection of a voltage differential between said outgoing cold and ground lines, whereby displacement of said pole against the other of said test contacts feeds current through said resistor to said detector coil;

a main switch connected in series between said incoming hot line and said outgoing hot line; and

control means connected between said detector contacts of said detector relay and said main switch for opening said main switch on actuation of said detector contacts on detection of said voltage differential and on energization of said detector coil by a current through said resistor.

4,077,057

GAS-INSULATED THYRISTOR ARRANGEMENT COMPRISING A PRESSURE ENCAPSULATION FORMED IN THE MANNER OF A TANK

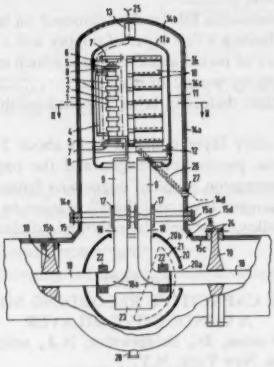
Wilfried Rameil; Manfred Schraudolph, and Gerd Thiele, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 28, 1977, Ser. No. 772,673

Claims priority, application Germany, Mar. 8, 1976, 2609512

Int. Cl.[2] H05K *7/20*

U.S. Cl. 361—386 **23 Claims**



1. Apparatus comprising at least one gas insulated thyristor arrangement said arrangement including:

at least one thyristor column comprising disc-type thyristors stacked side by side and heat sinks each of which is disposed between an adjacent pair of thyristors and serves to conduct current;

driving modules and external circuit modules electrically connected to said one thyristor column;

a substantially rotationally symmetric shielding means, said shielding means being connected in an electrically conductive manner to and surrounding said one column, said driving modules and at least a portion of said external circuit modules;

an electrically conductive pressure encapsulation including a pressure tube and an end plate closing an end of said tube and integrally formed therewith so as to form a tank;

an electrically insulating post fastening said shielding means to said pressure encapsulation;

further means comprising at least one bulkhead formed from an electrically insulating material closing off the other end of said tube in a gas-tight manner;

and electrical connecting leads extending through said bulkhead for providing electrical connections to said one thyristor column.

4,077,058

METHOD AND APPARATUS FOR EXECUTING AN EXTENDED DECOR INSTRUCTION

Marc Appell; Jacques Michel Jean Bienvenu, both of Paris; Jean-Claude Marcel Cassonnet, Conflans-Ste-Honorine, and Georges Lepicard, Vaucresson, all of France, assignors to Compagnie Honeywell Bull, Paris, France

Filed Dec. 2, 1974, Ser. No. 529,257

Claims priority, application France, Nov. 30, 1973, 73 42695

Int. Cl.[2] G06F *9/18*

U.S. Cl. 364—200 **18 Claims**

1. A data processing system comprising:

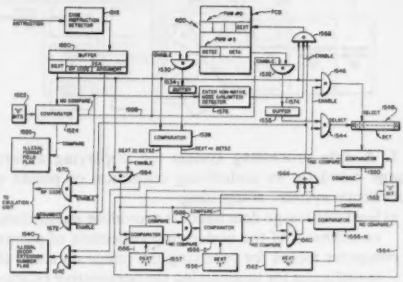
A. means for receiving an instruction designating the switching of the operating mode of a process from a first mode to a specified function in a second mode, wherein said first mode is the native mode of said system during which

processes are executed in the normal manner intended by said system, and wherein said second mode is the non-native mode of said system;

B. a plurality of first means for indicating, the contents of each of which indicate the operational state of a said process at any specified time, said plurality of said first means for indicating equal in number to the number of processes included and capable of execution in said system;

C. a plurality of second means responsive to said means for receiving for indicating the executability of said specified function in said system, wherein each of said second means for indicating includes a plurality of indicia, each for indicating the executability of different specified functions in said system, wherein said specified function is indicated by a number in a first portion of said instruction;

D means for addressing said second means for indicating



with a first portion of the contents of said first means for indicating;

E. means coupled to said means for receiving for addressing one of said indicia in the addressed second means for indicating by the number indicated in said first portion of the contents of said instruction;

F. means for activating said specified function for said process in said second mode if said second means for indicating indicates that said specified function is executable in said system;

G. means for generating a first signal if the number indicated by said first portion of the contents of said instruction is greater than a number indicated by a portion of the contents of said first means for indicating; and

H. means, responsive to said first signal, for disabling said means for activating such that said specified function for said process in said non-native mode will not be executed in said system.

4,077,059

MULTI-PROCESSING SYSTEM WITH A HIERARCHIAL MEMORY HAVING JOURNALING AND COPYBACK

Vincent A. Cordi, 400 Fordham Road, Vestal, N.Y. 13850, and Bruce A. Edson, 16 Woodside Road East, Apalachin, N.Y. 13732

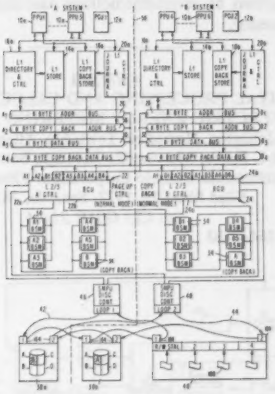
Filed Dec. 18, 1975, Ser. No. 642,035
Int. Cl.² G06F *13/08*
U.S. Cl. 364—200 **4 Claims**

1. In a multi-level hierarchial memory system made up of a lowest level with a first data store means for storing data for the memory system and a plurality of sequentially higher levels each level with its own first data store means for storing data at that level which is a portion of the data contained in the first data store means at the next lower level in the hierarchy and for also storing changes of addition or modification to units of said portion of the data made by computer instruction from a processing unit, an improvement in the means of copying back from any given level of the sequentially higher levels into the next lower level said changes stored at said given level comprising:

a second data store means at said any given level that is coupled to the processing unit for the purpose of storing a duplicate copy of only those units of the data at said any given level that contain said changes to be copied back down to lower levels, said second data store means having the capacity to store only a small portion of the data units capable of being stored in the first data store means of said any given level;

a journal means coupled to the processing unit for recording the locations of data units at said any given level in the order in which data units stored in the second data store means at said given level were first altered at that given level by one of said changes that has not been copied back into any lower level;

copyback means coupled to the next lower level in the hierarchy and to the journal means for copying back said units of data at said any given level that contains said



changes made in the data at said given level into the next lower level in the hierarchy in said order recorded in the journal means;

counting means at said any given level for counting the number of data units at said any given level that have yet to be copied back to the next lower level at any given moment and,

forced copy back means coupled to the copyback means for starting the copy back means to copy back changes in the next lower level of the hierarchy when the count in the counting means reaches a count which is within a preselected number of counts of the data unit capacity of the second data store at said any given level so that the number of data units at said any given level that have yet to be copied back will not exceed the data unit capacity of the second data store.

4,077,060

ASYMMETRICAL MULTIPROCESSOR SYSTEM

Ronald Eugene Bodner, and Richard Craig Kiscaden, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

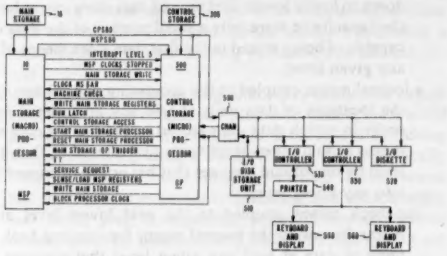
Filed Dec. 27, 1976, Ser. No. 754,390
Int. Cl.² G06F *15/16, 15/20*
U.S. Cl. 364—200 **15 Claims**

1. In an asymmetrical multiprocessor system comprising:

an addressable control storage containing microinstructions including microinstructions for controlling initiation of operation of a macroprocessor, a microprocessor connected to address said control storage to fetch and execute microinstructions therefrom,

an addressable main storage containing macroprocessor instructions, and

a macroprocessor connected under control of said microprocessor for initiation of fetching and executing macroinstructions by microinstructions executed by said microprocessor.

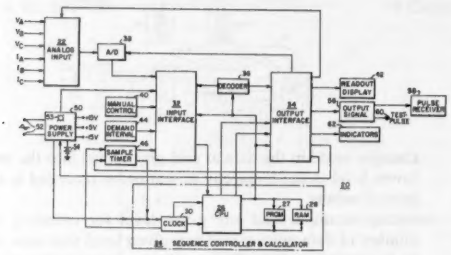


4,077,061

DIGITAL PROCESSING AND CALCULATING AC ELECTRIC ENERGY METERING SYSTEM

Paul M. Johnston, Hempfield Township, Allegheny County, and Andras I. Szabo, Murrysville Borough, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1977, Ser. No. 781,261
Int. Cl.[2] G01R *21/06*
U.S. Cl. 364—483 **30 Claims**



1. A digital processing and calculating AC electric energy metering system for measuring a parameter of an electric energy quantity occurring in an electric utility system, said metering system comprising:

signal sample means including inputs and outputs, said inputs receiving intput voltage and current signal components of said AC electric energy quantity, said outputs producing instantaneous values of the input voltage and current signals when said signal sample means is rendered to a sampling state;

sampler timer means producing pulse signals at randomly varying intervals, said pulse signals initiating the sampling state of said signal sample means at randomly occurring sampling times;

analog to digital converter means producing binary signal representations of each of the instantaneous signal values;

calculating means computing an incremental quantity of the input signals from said binary signal representations thereof occurring at each sampling time;

accumulator means receiving each incremental quantity computed so as to store totalized values thereof, said totalized values being a time integral of the sums of each computed incremental quantity received to produce measured values of said parameter; and

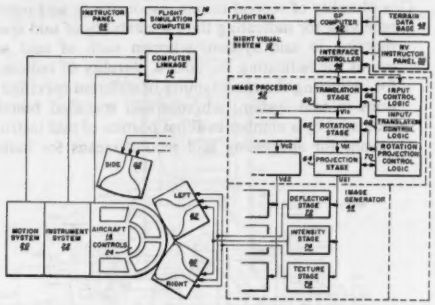
output means responsive to the stored totalized values of said accumulator means to produce data output signals representing the measured parameter values.

4,077,062

REAL-TIME SIMULATION OF A POINT SYSTEM WITH A CRT BLANK PERIOD TO SETTLE BEAM TRANSIENTS

Robert Gary Nielsen, Portola Valley, Calif., assignor to The Singer Company, Binghamton, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,645
Int. Cl.[2] G09B *9/08*; H04N *7/00*
U.S. Cl. 364—521 **11 Claims**



1. A data processing system for displaying a perspective image based on an underlying collection of points within a coordinate system, comprising:

at least one image data base for providing image data and the coordinates of the underlying collection of points;

computer means for receiving the image data and the point coordinates for maintaining the perspective relationship of the points within the collection of points in response to changes in the axis of view relative to the coordinate system of the collection of points;

CRT display means responsive to the computer means for displaying the perspective image; and

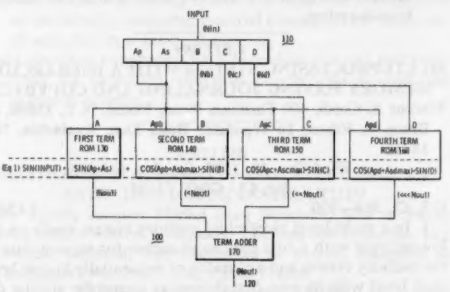
a CRT display control for providing interpoint blank periods and point display periods.

4,077,063

APPARATUS FOR RAPIDLY DETERMINING THE TRIGONOMETRIC FUNCTIONS OF AN INPUT ANGLE

Thomas Peter Lind, Santa Clara, Calif., assignor to The Singer Company, Binghamton, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,562
Int. Cl.[2] G06F *15/34*
U.S. Cl. 364—729 **14 Claims**



1. Apparatus responsive to a signal representation of an input angle (INPUT) having N*in* binary places for providing a signal representation of an approximation of the function SIN(INPUT) having N*out* bits, comprising:

input means for receiving the N*in* binary places of INPUT and identifying a set of at least three progressively smaller subangles A, B, C . . . LAST-1, and LAST formed by consecutive groups of sequential binary places such that:

INPUT = A + B + C + . . . LAST-1, + LAST,
and

INPUT > A > B > C . . . LAST-1, > LAST;

a set of function generator means responsive to the input means, each of which provides a term of the approximate sine relationship:

SIN(INPUT) ≅ SIN(A) + COS(A)SIN(B) + COS(A)SIN(C) + . . . + COS(A)SIN(LAST−1) + COS(A)SIN(LAST);

and

adder means responsive to each function generator for combining the terms therefrom to form the approximate sine relationship.

DESIGN PATENTS

GRANTED FEBRUARY 28, 1978

ERRATA

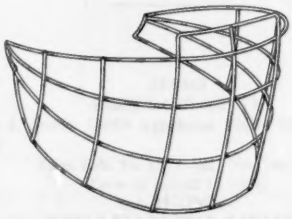
For CLASS	See PATENT NO.
D23–42	247,378

DESIGNS

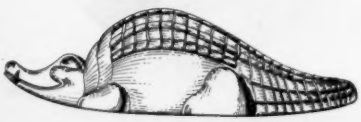
FEBRUARY 28, 1978

247,331
SWEATSHIRT
Phillip L. Nally, 302 W. Muir, Bardstown, Ky. 40004
Filed Feb. 4, 1975, Ser. No. 547,056
The portion of the term of this patent subsequent to Feb. 4, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—215

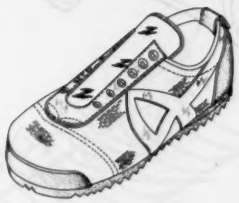
247,332
HOCKEY FACE MASK
Edward Quan, 228 Berkshire Lane, Stockton, Calif. 95207
Filed May 28, 1976, Ser. No. 691,128
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—233



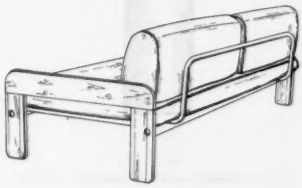
247,333
NOVELTY HAT
Ronald L. Dame, 740 Hoosier Ave., Evansville, Ind. 47715
Filed Sep. 7, 1976, Ser. No. 720,962
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—250



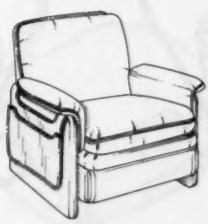
247,334
SPORTING SHOE
Kyozo Sasaki, No. 4-8, Rokurokuso-cho, Ashiya, Hyogo, Japan
Filed Jun. 4, 1976, Ser. No. 692,942
Claims priority, application Japan, Feb. 27, 1976, 51-7054
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—309



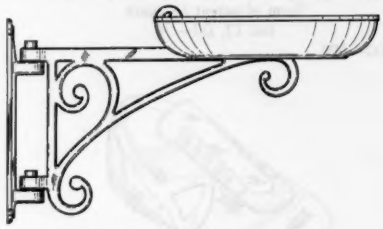
247,335
SOFA
Jan Dranger, and Johan Huldt, both of Stockholm, Sweden, assignors to Innovator Design AB, Stockholm, Sweden
Filed Jun. 14, 1976, Ser. No. 695,547
Claims priority, application Sweden, Dec. 16, 1975, 2503/75
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



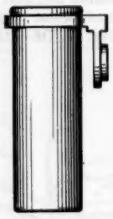
247,336
CHAIR
Morris F. Fisher, Riveria Beach, Fla., assignor to Futorian Corporation, Amsterdam, N.Y.
Filed Sep. 27, 1976, Ser. No. 727,186
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71



247,337
WALL MOUNTED STAND FOR POTTED PLANTS OR THE LIKE
Lee Richard Chasen, Port Chester, N.Y., assignor to Coats & Clark, Inc., Stamford, Conn.
Filed Aug. 12, 1976, Ser. No. 713,890
Term of patent 14 years
Int. Cl. D6—*06, 04*
U.S. Cl. D6—137



247,338
VASE
Edward A. Wagschal, 21 E. 62nd St., New York, N.Y. 10021
Filed Apr. 8, 1977, Ser. No. 785,939
Term of patent 14 years
Int. Cl. D6—*06;* D11—*02*
U.S. Cl. D6—137

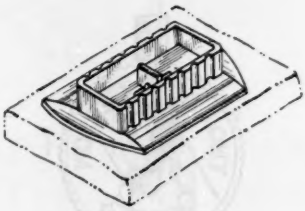


247,339
COMBINED PLANT CONTAINER AND SUPPORT
Earl M. Reiback, 20 E. Ninth St., New York, N.Y. 10003
Filed Apr. 8, 1976, Ser. No. 674,919
Term of patent 14 years
Int. Cl. D6—*04;* D11—*02*
U.S. Cl. D6—182

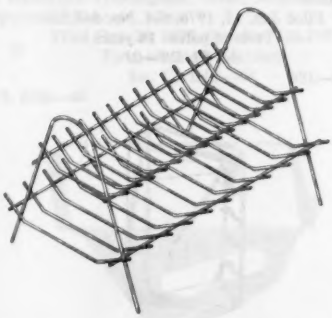
247,340
LAUNDRY BAG
Gerald M. Benstock, Lloyd Harbor, N.Y., assignor to Superior Surgical Mfg. Co., Inc., Huntington, N.Y.
Filed Dec. 17, 1975, Ser. No. 641,426
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—162

247,341
PORTABLE VACUUM CLEANER
Charles W. Pelly, Calabasas, Calif., assignor to Cal Custom Accessories, Inc.
Filed Aug. 9, 1976, Ser. No. 712,832
Term of patent 14 years
Int. Cl. D7—*05;* D15—*05*
U.S. Cl. D7—164

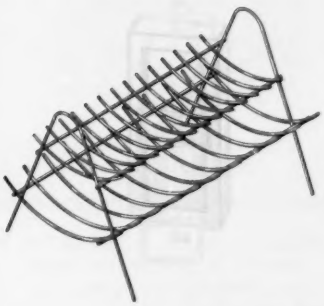
247,342
HOLDER FOR A SCOURING IMPLEMENT
Louis J. Silver, 3434 Baker St., San Francisco, Calif. 94123
Division of Ser. No. 638,345, Dec. 8, 1975, Pat. No. Des. 242,893. This application Aug. 4, 1976, Ser. No. 711,482
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—178



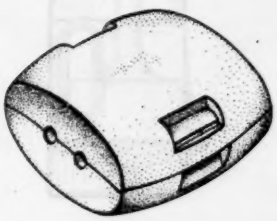
247,343
FIREPLACE GRATE
Edward J. Smith, 12559 Appaloosa Place, Broomfield, Colo. 80020
Filed Feb. 16, 1977, Ser. No. 768,947
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207



247,344
FIREPLACE GRATE
Edward J. Smith, 12559 Appaloosa Place, Broomfield, Colo. 80020
Filed Feb. 16, 1977, Ser. No. 768,948
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207

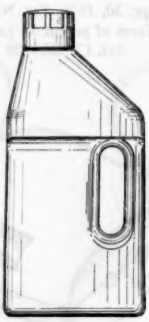


247,345
COUPLING FOR A LANYARD
Robert P. Mulholland, Centerville, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Filed Apr. 30, 1976, Ser. No. 681,877
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—383



247,346
BOTTLE PACKAGE
Adam J. Grodin, Forest Hills, N.Y., and Charles J. Tiboldo, Wayne, N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Jul. 28, 1976, Ser. No. 709,481
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—12

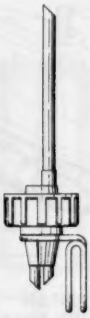
247,347
COMBINED BOTTLE AND CAP
Richard James Klingaman, Darien, Conn., assignor to Colgate-Palmolive Company, New York, N.Y.
Filed Aug. 5, 1976, Ser. No. 711,913
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—40



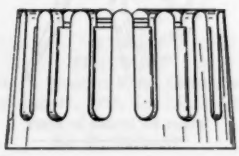
247,348
DECANTER
Adam J. Grodin, Forest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Jul. 31, 1975, Ser. No. 600,709
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—64

247,349
PACKAGING TRAY FOR CONTAINING AND DISPENSING RAZOR BLADE UNITS
Peter B. Carr, Morpeth, England, assignor to Wilkinson Sword Ltd., England
Filed Jan. 12, 1976, Ser. No. 648,524
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—186

247,350
COMBINED CLOSURE CAP AND BRAKE FLUID DISPENSER
John Edward Witt, 12 Manor Gradens, Hampton, Middlesex, England
Filed Oct. 10, 1975, Ser. No. 621,541
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275



247,351
LIQUID CONTAINER CLOSURE CAP
Francis M. L. Barthropp, West Vancouver, Canada, assignor to Barton of Canada Ltd., Burnaby, Canada
Filed Aug. 23, 1976, Ser. No. 716,892
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—285



247,352
INFRA-RED RADIOMETER
Oskar Heininger, Framingham, Mass., assignor to Williamson Corporation, Concord, Mass.
Filed Oct. 28, 1975, Ser. No. 626,310
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46

247,353
PORTABLE VOLT-OHM-AMMETER OR THE LIKE
Takeo Kuramoto, Yokohama, Japan, assignor to Kyoritsu Electrical Instruments Works, Ltd., Tokyo, Japan
Filed Oct. 8, 1975, Ser. No. 620,695
Claims priority, application Japan, Jul. 26, 1975, 50-30807
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—79

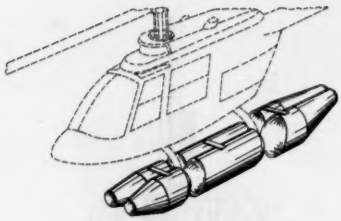
247,354
LINE MARKER BUOY
Robert Sinclair, Tangier Island, Va. 23440
Filed Mar. 22, 1977, Ser. No. 779,955
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—107

247,355
SCULPTURE
Donald R. Ditto, 4938 Sharp St., Dallas, Tex. 75247
Filed Dec. 22, 1975, Ser. No. 642,702
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—137

247,356
COMBINED LAMP AND PLANT SUPPORT OR THE LIKE
Herbert E. Wright, 504 E. Davie St., Raleigh, N.C. 27601
Filed Dec. 24, 1975, Ser. No. 644,023
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—144

247,357
HYDROPONIC TANK
Michael Wade Gray, 3435 Tennyson, Denver, Colo. 80212
Filed Feb. 3, 1977, Ser. No. 765,338
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—156

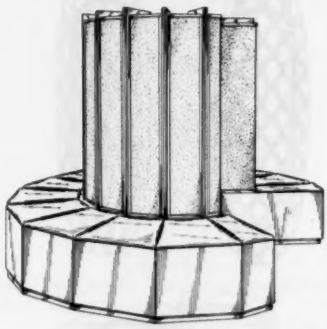
247,358
SEGMENTED HELICOPTER FLOAT
Ralph A. Miller, Monmouth Beach, and Randall F. White, Bricktown, both of N.J., assignors to The Garrett Corporation
Filed May 21, 1976, Ser. No. 689,027
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—81



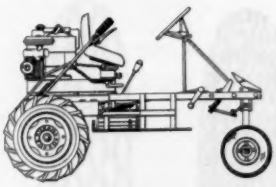
247,359
TRUCK BODY ROCK SHIELD
Warren Ewen, Jeffers, Minn. 56145
Filed May 21, 1976, Ser. No. 688,686
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—190

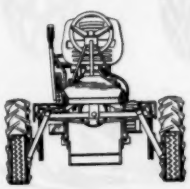
247,360
EXHAUST GAS DIFFUSER FOR AN AUTOMOBILE ENGINE
Kazuhiro Hamaguchi, and Yasuaki Oku, both of Yokohama, Japan, assignors to Kabushiki-Kaisha Taiyo, Yokohama, Japan
Filed May 21, 1976, Ser. No. 688,529
Claims priority, application Japan, Jan. 16, 1976, 51-534
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—194

247,361
COMPUTER CABINET
Seymour R. Cray, Jr., Lilydale, Minn., and Maurice Dean Roush, Chippewa Falls, Wis., assignors to Cray Research, Inc., Chippewa Falls, Wis.
Filed Jun. 30, 1976, Ser. No. 701,077
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—40

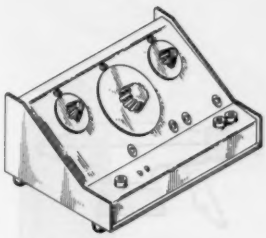


247,362
TRACTOR
J. D. Puckett, Rte. 3, Benedict Road, Cedartown, Ga. 30125
Filed Aug. 11, 1976, Ser. No. 713,291
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—23

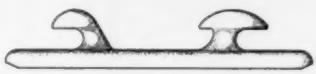




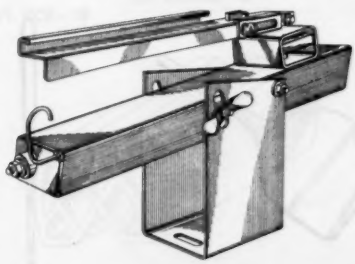
247,363
STUDENT-PROGRAMMABLE EDUCATIONAL INSTRUMENTATION DEVICE
Leonard Hughes, 1526 Mountain Blvd., Oakland, Calif. 94611
Filed May 7, 1976, Ser. No. 684,100
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—60



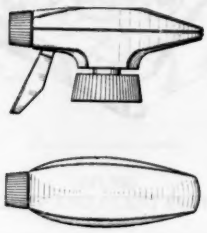
247,364
RETAINER FOR FISHING LINES
Robert E. Schulz, 2131 Fairview St., Oshkosh, Wis. 54901
Filed Jan. 31, 1977, Ser. No. 764,048
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—25



247,365
MECHANICAL TRAP FOR THROWING CLAY TARGETS
Kenneth C. Rowlands, Utica; John P. Linde, and Kenneth W. Soucy, both of Richfield Springs, all of N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.
Filed Feb. 7, 1977, Ser. No. 766,605
Term of patent 14 years
Int. Cl. D22—*04*
U.S. Cl. D22—99

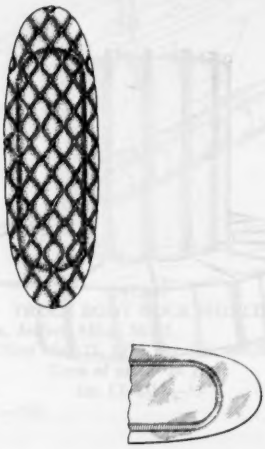


247,366
SPRAY PUMP
David A. Jones, Dayton, Ohio, and John Pardo, Yonkers, N.Y., assignors to Drackett Co.
Filed Oct. 12, 1976, Ser. No. 731,177
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17



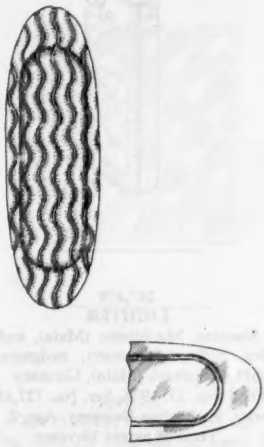
247,367
DENTAL FACE BOW BITE FORK
William B. Dragan, R.F.D. No. 1, Burr St., Fairfield, Conn. 06430
Filed Jan. 3, 1977, Ser. No. 756,174
Term of patent 14 years
Int. Cl. D24—*99, 02*
U.S. Cl. D24—10

247,368
CONTOURED SANITARY NAPKIN
Howard A. Whitehead, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Dec. 27, 1976, Ser. No. 754,343
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

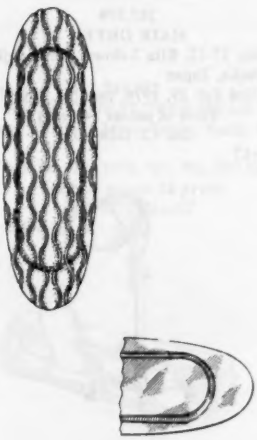


247,369
CONTOURED SANITARY NAPKIN
Howard A. Whitehead, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Dec. 27, 1976, Ser. No. 754,498
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

247,370
CONTOURED SANITARY NAPKIN
Howard A. Whitehead, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Dec. 27, 1976, Ser. No. 754,499
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

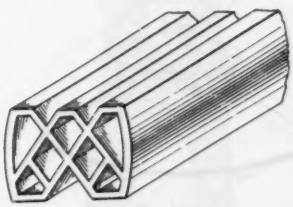


247,371
CONTOURED SANITARY NAPKIN
Howard A. Whitehead, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Dec. 27, 1976, Ser. No. 754,500
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

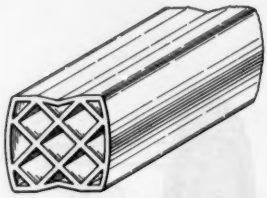


247,372
CONTOURED SANITARY NAPKIN
Howard A. Whitehead, Appleton, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed Dec. 27, 1976, Ser. No. 754,638
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D24—51

247,373
COMPRESSION SEAL
Guy S. Puccio, Snyder, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.
Filed Jun. 21, 1976, Ser. No. 697,912
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75

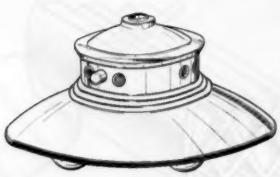


247,374
COMPRESSION SEAL
Guy S. Puccio, Snyder, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.
Filed Jun. 21, 1976, Ser. No. 698,201
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75

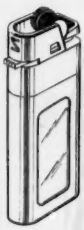


247,375
FACING PANEL FOR FACADES OR THE LIKE
Edward C. Hallock, Summit, and Michael Polifka, Spotswood, both of N.J., assignors to Construction Specialties, Inc., Cranford, N.J.
Filed Mar. 19, 1976, Ser. No. 668,603
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—87

247,376
CIGARETTE LIGHTER
Sadao Yoshinaga, Tokyo, Japan, assignor to Yoshinaga Prince Co., Ltd., Japan
Filed Jan. 6, 1977, Ser. No. 757,384
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—39



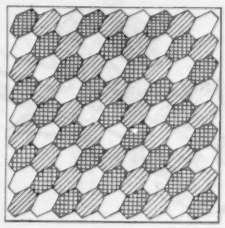
247,377
DISPOSABLE CIGARETTE GAS LIGHTER
Tomio Nitta, 2181-7, Enokiyato Kitahassaku-cho, Midori, Yokohama, Japan
Filed Aug. 31, 1976, Ser. No. 719,244
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42



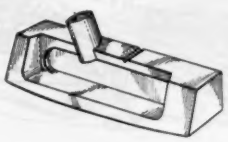
247,378
LIGHTER
Franz Alban Stuetzer, Muehlheim (Main), and Bernd Figur, Nieder-Roden, both of Germany, assignors to Rowenta-Werke, GmbH, Offenbach (Main), Germany
Filed Sep. 27, 1976, Ser. No. 727,315
Claims priority, application Germany, Apr. 2, 1976, 59941
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

247,379
HAIR DRYER
Minoru Hashino, 17-12, Kita 3-chome, Ten'nohjicho, Abenoku, Osakashi, Osaka, Japan
Filed Jul. 29, 1976, Ser. No. 709,771
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—17

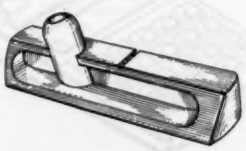
247,380
GAME BOARD
Casimir S. Strozewski, 2526 N. Santiago Ave., Santa Ana, Calif. 92706
Filed Mar. 31, 1976, Ser. No. 672,053
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



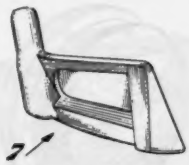
247,381
GOLF CLUB PUTTER HEAD
John S. Adkins, 2555 La Mesa Drive, Santa Monica, Calif. 90402
Filed Jun. 18, 1976, Ser. No. 697,695
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



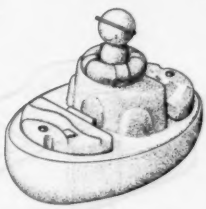
247,382
GOLF CLUB PUTTER HEAD
John S. Adkins, 2555 La Mesa Drive, Santa Monica, Calif. 90402
Filed Jun. 18, 1976, Ser. No. 697,696
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



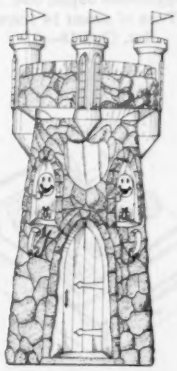
247,383
GOLF CLUB IRON HEAD
John S. Adkins, 2555 La Mesa Drive, Santa Monica, Calif. 90402
Filed Jun. 18, 1976, Ser. No. 697,697
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



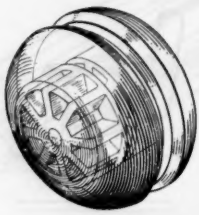
247,384
COMBINED TOY BOAT AND FIGURES THEREFOR
Shinroku Nakao, Yokohama, Japan, assignor to Combi Co., Ltd., Tokyo, Japan
Filed Jan. 5, 1976, Ser. No. 646,695
Claims priority, application Japan, Jul. 15, 1975, 50-29314
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 JJ



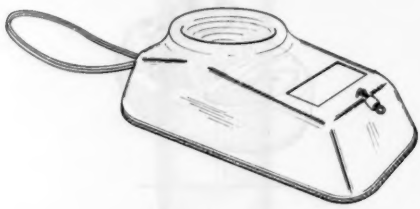
247,385
AUDIBLE AMUSEMENT CASTLE
Sidney N. Rideau, 1610 Monroe St., Gretna, La. 70053
Filed Feb. 9, 1976, Ser. No. 656,812
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



247,386
RETURN TOP
Werner Hellman, Baraboo, Wis., assignor to Flambeau Products Corporation, Baraboo, Wis.
Filed May 19, 1976, Ser. No. 688,022
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AH

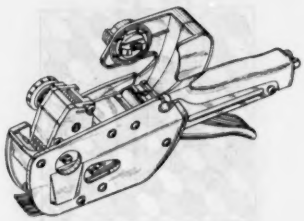


247,387
TETHER BALL GAME BASE
Lindsey G. Spivey, II, Dallas, Tex., assignor to Jokari/U.S., Inc., Dallas, Tex.
Filed Sep. 29, 1976, Ser. No. 727,661
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 P

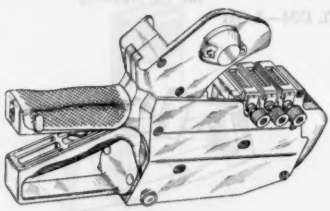


247,388
CASH REGISTER
Shigeru Kurozumi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 17, 1975, Ser. No. 641,753
Claims priority, application Japan, Jun. 23, 1975, 50-26499
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D52—4 A

247,389
LABELING MACHINE
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan
Filed Apr. 20, 1976, Ser. No. 678,725
Claims priority, application Japan, Dec. 13, 1975, 50-48864
Term of patent 14 years
Int. Cl. D18—*99*
U.S. Cl. D64—10



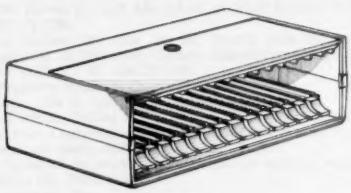
247,390
PORTABLE LABELING MACHINE
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan
Filed Jul. 12, 1976, Ser. No. 704,419
Claims priority, application Japan, Mar. 29, 1976, 51-10891
Term of patent 14 years
Int. Cl. D18—*79*
U.S. Cl. D64—10



247,391
ELECTRONIC CALCULATING MACHINE
Shigetoshi Hazama, and Masafumi Yamagami, both of Osaka, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Jun. 28, 1976, Ser. No. 700,147
Claims priority, application Japan, Jan. 14, 1976, 51-657
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B

247,392
BOTTLE BAG
Gary W. Coleman, 400 N. 1223 West #55, Clearfield, Utah 84015
Filed May 14, 1976, Ser. No. 686,390
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

247,393
CASSETTE CABINET
Alan Lowry, Canton, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.
Filed Jun. 1, 1976, Ser. No. 691,250
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D87—1 D



247,394
LUGGAGE CASE
Norbert H. J. Linke, Milan, Italy, assignor to S. T. Dupont, Paris, France
Filed Jun. 17, 1976, Ser. No. 696,968
Claims priority, application France, Dec. 23, 1975, 75.38805
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 F

247,395
COMBINED KEY RING AND COMB
Richard L. Earl, 14419 Montle, Clio, Mich. 48420
Filed Jul. 8, 1976, Ser. No. 703,411
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8.1

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PATENTS WERE ISSUED ON THE 28TH DAY OF FEBRUARY, 1978

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AB Bahco Ventilation: *See*—
Ferm, Bo Christer, 4,076,509, Cl. 55-320.000.

AB Bofors: *See*—
Eriksson, Kjell Viktor; and Aslund, Ivan, 4,075,926, Cl. 89-16.000.

AB Olle Lindstrom: *See*—
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Standley, Wendell Evert, 4,075,820, Cl. 53-329.000.
Tomioka, Shinji; and Mori, Yasuki, 4,076,931, Cl. 536-17.000.

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Maulding, Donald Roy, 4,076,728, Cl. 260-343.400.
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Vega, Mary-Louise, 4,076,645, Cl. 252-188.3CL.

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Backer, Karl-Heinrich; and Schlachta, Hermann, to Varta Batterie Aktiengesellschaft. Pole bolt seal for storage batteries. 4,076,908, Cl. 429-184.000.

Baer, Ralph H., to Sanders Associates, Inc. Universal television interface. 4,077,049, Cl. 358-93.000.

Bailey, Frank C.: *See*—
Gibson, Harry W.; Bailey, Frank C.; and Mincer, Joseph L., 4,076,893, Cl. 428-407.000.

Baird-Atomic, Inc.: *See*—
Brennan, Thomas M.; and Burley, Robert M., 4,076,978, Cl. 250-213.0VT.

Baker International Corporation: *See*—
Evans, Robert W., 4,076,086, Cl. 175-297.000.

Banet, Joseph. Solar radiation collector. 4,076,024, Cl. 126-271.000.

Banker, William W.; and Lumbis, Anthony W., to General Signal Corporation. Electro-pneumatic brake system with valve actuating checking circuit. 4,076,322, Cl. 303-1.000.

Barannik, Ivan Andreevich; Kachurka, Alexandr Nikolaevich; Zharovsky, Ivan Vasilievich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; and Mazurkevich, Alexandr Borisovich. Centrifugal pelletizer. 4,076,472, Cl. 425-8.000.

Baranov, Vladimir Nikitich: *See*—
Lifshits, Viktor Senderovich; Sukhanov, Alexandr Alexandrovich; Dergachev, Nikolai Makarovich; Pevnev, Arkady Alexeevich; Baranov, Vladimir Nikitich; and Shklyanov, Leonid Pavlovich, 4,076,973, Cl. 219-97.000.

Barbal, Andrew. Automatically disengagable safety buckle. 4,075,741, Cl. 24-201.0TR.

Bareis, Marvin A.; and Nisbet, George C., to Kellwood Company. Boat cover means. 4,075,723, Cl. 9-1.500.

Barker, Lynn M., to Reed Tool Company. Fracture toughness test method. 4,075,886, Cl. 73-88.00R.

Barker, Lynn Marshall, to Terra Tek, Inc. Fracture specimen loading machine. 4,075,884, Cl. 73-91.000.

Barlow, Alan, to Smiths Industries Limited. Mounting arrangements and units for use therein. 4,076,353, Cl. 312-350.000.

Baron, Seymour, to Hexcel Corporation. Production of N-alkylated amines and catalyst therefor. 4,076,649, Cl. 252-440.000.

Barr, Rolla W. Device for securing spare tires. 4,076,158, Cl. 224-42.250.

Barrington, Burchus Q.: *See*—
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,076,077, Cl. 166-315.000.

Barter, Frederick William; and Brett, Peter James Douglas Victor, to Ciba-Geigy Corporation. Molds for encapsulating electrical components. 4,076,791, Cl. 264-272.000.

Bartholl, Hermann: *See*—
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.

Bartholmey, Don S., to North Star Ice Equipment Company. Ice making machine with improved drip shield. 4,075,868, Cl. 62-347.000.

Bartholomew, Jack Leonard; and Bristow, Derek John. Operating mechanisms. 4,075,899, Cl. 74-102.000.

Bartko, John: *See*—
Chu, Chang K.; Bartko, John; and Felice, Patrick E., 4,076,555, Cl. 148-1.500.

Bartsch, Wolfgang: *See*—
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.

BASF Aktiengesellschaft: *See*—
Buelow, Horst; Hohenschutz, Heinz; Schmidt, Johannes E.; and Sachsze, Werner, 4,076,594, Cl. 203-15.000.
Freyberg, Peter; Horn, Dieter; Oppenlaender, Knut; Wolf, Hans; and Distler, Dieter, 4,076,497, Cl. 8-21.00C.
Hoffmann, Werner; and von Fraunberg, Karl, 4,076,748, Cl. 260-586.00F.
Theysohn, Rainer; Wurmb, Rolf; Leutner, Bernd; and Schlimper, Hans-Ulrich, 4,076,682, Cl. 260-37.00N.
Urban, Friedrich; Buechner, Oskar; Hartig, Ulrich; and Gropper, Hans, 4,076,919, Cl. 526-64.000.

BASF Wyandotte Corporation: *See*—
Hetzel, Eckard; Koehler, Waldemar; Vock, Georg Friedrich; and Bittler, Rolf, 4,076,577, Cl. 159-47.00R.

Bass, Sidney; and St. Pierre, Raymond Marie, to Mattel, Inc. Machine for needlepoint or the like. 4,075,955, Cl. 112-79.00R.

Bates, A. Arthur; and Cook, Norman J., to Zaleboats, Incorporated. Spring biased snap hook and method. 4,075,966, Cl. 114-114.000.

Bates, Harry E. Optical coherence measuring device. 4,076,423, Cl. 356-114.000.

Bates, Richard L., to United States of America, Navy. Thermal stress-relieving coupling member and support. 4,076,393, Cl. 350-318.000.

Batha, Howard Dean; and Hazelet, Glenn John, to American Kynol, Inc. Process for manufacturing novaloid fiber. 4,076,692, Cl. 260-59.00R.

Battelle Pacific N. W. Laboratories: *See*—
Olesen, Douglas E.; and Shuckrow, Alan J., 4,076,615, Cl. 210-5.000.

Bauer, Hermann: *See*—
Wacker, Erich; Hofmann, Heinz; Kopp, Karl; Bauer, Hermann; von Ey, Volker; and Weiss, Franz, 4,075,934, Cl. 92-159.000.

Bauer, Ronald S., to Shell Oil Company. Epoxy resin composition having improved physical properties. 4,076,764, Cl. 260-834.000.

Baugh, Edward D.: *See*—
Moody, Warren L.; and Baugh, Edward D., 4,076,094, Cl. 180-108.000.

Baum, Werner; and Munding, German, to Messerschmitt-Bolkow-Blohm GmbH. Thermal drilling device. 4,076,082, Cl. 175-14.000.

Baxter, Bryan Henry, to British Aircraft Corporation Limited. Lubricants and their method of preparation. 4,076,635, Cl. 252-18.000.

Baxter Travenol Laboratories, Inc.: *See*—
Cammarata, Frank, III; Miller, Joe Alan; and Martin, Jerry D., 4,076,063, Cl. 150-.500.

Bayer Aktiengesellschaft: *See*—
Horstmann, Harald; Meng, Karl; and Wehinger, Egbert, 4.076,943, Cl. 548-360.000.
Lorenz, Walter; and Hammann, Ingeborg, 4,076,808, Cl. 424-211.000.
Lorenz, Walter, deceased; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,076,806, Cl. 424-200.000.
Naumann, Klaus; Sasse, Klaus; and Lurssen, Klaus, 4,076,517, Cl. 71-86.000.
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,076,925, Cl. 526-204.000.
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased; Bien, Gabriele; and Bien, Dorothee, 4,076,736, Cl. 260-382.000.
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.
Thom, Karl-Friedrich; and Schliebs, Reinhard, 4,076,763, Cl. 260-824.00R.
Zecher, Wilfried; Clarenz, Werner; and Merten, Rudolf, 4,076,694, Cl. 260-77.5MA.

Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., to Rohm and Haas Company. Herbicidal 4-trifluoromethyl-4-nitrodiphenyl ethers. 4,076,741, Cl. 260-465.00F.

Baylor, John Merlin, to J. I. Case Company. Track joint with combined thrust member and seal members. 4,076,333, Cl. 305-11.000.

Bean, Lloyd F.; and Gundlach, Robert W., to Xerox Corporation. Xerographic binder plate. 4,076,528, Cl. 96-105.00R.

Bearden, Roby, Jr., to Exxon Research & Engineering Co. Combined disulfurization and conversion with alkali metals. 4,076,613, Cl. 208-108.000.

Beaumont, Gerald P.; and Jones, William C., to Dow Chemical Company, The. Solvent soluble warp size. 4,076,629, Cl. 252-8.600.

Beck, Henry Nelson, to Dow Chemical Company, The. Nucleation of isotactic polystyrene. 4,076,910, Cl. 526-6.000.

Beck, Orville F.: *See*—
Theurer, John; Beck, Orville F.; and Doherty, James T., 4,075,814, Cl. 52-79.500.

Becker, Charles J., to American Videonetics Corporation. Film projection system. 4,076,397, Cl. 353-26.00R.

Beckman Instruments, Inc.: *See*—
Chulay, Steven John; and Grilli, Victor John, 4,076,170, Cl. 233-26.000.
Schwab, Christopher Morrison. 4,076,288, Cl. 292-113.000.

Beets, Roland H. C.: *See*—
Wijnhoven, Jan M. A.; Oancea, Alexandru; Vanhove, Henri C. J.; and Beets, Roland H. C., 4,076,276, Cl. 280-714.000.

Behne, Ernst-August; and Straihammer, Reinhard, to Siemens Aktiengesellschaft. Dental handpiece. 4,075,761, Cl. 32-27.000.

Behrends, Bertwin E.; Hoehn, Richard F.; and Poirot, James M., to Caterpillar Tractor Co. Fluid pressure-controlled winch mechanism. 4,076,219, Cl. 254-187.400.

Bekasova, Nina Ivanovna: *See—*
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Belanger, Patrice C., to Merck Sharp & Dohme (I.A.) Corporation. 2-(4-Substituted-1,2,5-thiadiazole-3-yloxy)-acetaldehydes. 4,076,939, Cl. 544-134.000.

Bell & Howell Company: *See—*
Fleischman, Andor A., 4,076,390, Cl. 350-216.000.
Kim, Raymond W. H.; and Figge, Erwin E., 4,076,247, Cl. 273-105.600.
Persha, Thomas J.; and Jagielski, David, 4,076,400, Cl. 353-95.000.

Bell Telephone Laboratories, Incorporated: *See—*
Agraz-Guerena, Jorge; and Fulton, Alan William, 4,076,556, Cl. 148-1.500.
Boyd, Gary Delane; and Thurston, Robert Norton, 4,077,023, Cl. 333-30.00R.
DiMarcello, Frank Vincent; and Williams, John Charles, 4,076,380, Cl. 350-96.310.
Muska, Willis Martin; and Personick, Stewart David, 4,076,375, Cl. 350-96.150.
Ren, Chung-Li; and Wang, Han-Chiu, 4,077,039, Cl. 343-786.000.
Streisand, Kenneth, 4,076,962, Cl. 179-6.30R.
Tamburro, Peter James, 4,076,356, Cl. 339-17.00C.
Wattenbarger, Blake Lane, 4,076,968, Cl. 179-84.00R.

Beloit Corporation: *See—*
Sokolow, Nickolas N., 4,076,485, Cl. 425-562.000.

Bencini, Roberto. Dual friction clutch for motion-picture projectors. 4,076,109, Cl. 192-48.400.

Bendix Corporation, The: *See—*
Helava, Uuno Vilho, 4,077,030, Cl. 340-183.000.

Bennett, Harold F.; and Liu, Wai-Min, to Xerox Corporation. Zoom lens assembly. 4,076,388, Cl. 350-187.000.

Bennett, Ronald: *See—*
Field, Peter Graham Spencer; and Bennett, Ronald, 4,076,759, Cl. 260-621.00C.

Bentley, Terence James: *See—*
Asato, Goro; and Bentley, Terence James, 4,076,952, Cl. 560-28.000.

Bentz, Erwin John Herman, to Caterpillar Tractor Co. Modular heat exchanger with pivotal cores. 4,076,072, Cl. 165-41.000.

Bentz, Francis: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,076,925, Cl. 526-204.000.

Berberich, Joseph P.: *See—*
Bundy, Wayne M.; Berberich, Joseph P.; and Sastre, David, 4,076,548, Cl. 106-288.00B.

Bergen, Gerhard Stanley: *See—*
Follows, James Samuel; and Bergen, Gerhard Stanley, 4,076,289, Cl. 292-226.000.

Berger, Richard M., to American Filtrona Corporation. Method and apparatus for making tobacco smoke filter. 4,075,936, Cl. 93-1.00C.

Berggren, Kenneth S.: *See—*
Kubat, Josef; and Berggren, Kenneth S., 4,076,568, Cl. 156-229.000.

Berkowitz, Irving L., to Kason Hardware Corporation. Convertible tube connecting system. 4,076,429, Cl. 403-2.000.

Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich. Anaerobic composition comprising oligocarbonateacrylates benzoyl peroxide and ferrocene. 4,076,742, Cl. 260-47.0UA.

Berlin, Alla Markovna: *See—*
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Bermingham, Peter D.; and Chin, Robert W., to Goodyear Aerospace Corporation. Snap fasteners for brake disk wear plates. 4,076,106, Cl. 188-250.00G.

Bernath, Louis: *See—*
Ash, Edward B.; Bernath, Louis; and Facha, Joseph V., 4,076,583, Cl. 176-35.000.

Bernatt, Joseph; and Steegmueller, Alfred, to S&C Electric Company. High voltage fuse and method of attaching tubular members therein. 4,075,755, Cl. 29-623.000.

Bernhard, Horst; and Esselborn, Reiner, to Merck Patent Gesellschaft mit beschrankter Haftung. Carbon black-containing pigments and process for their preparation. 4,076,551, Cl. 106-291.000.

Bernier, Harold J.; and Daniels, Norman F. Flip top and platform. 4,076,252, Cl. 273-141.00R.

Bert, Walter J. Adjustable industrial paint sprayer. 4,076,175, Cl. 239-532.000.

Bertannier, Daniel: *See—*
Brossel, Maurice; Laurent, Gilbert; and Bertannier, Daniel, 4,076,885, Cl. 428-286.000.

Bertling, Johannes-Gerhard, to Robert Bosch GmbH. Fuel mixture control apparatus. 4,075,993, Cl. 123-119.0EC.

Bertschmann, Silvio. Expansion joint bridging device. 4,076,440, Cl. 404-69.000.

Besenhardt, Jurgen: *See—*
Fritz, Heinz Peter; Besenhardt, Jurgen; and Rauschenbach, Gerhard, 4,076,901, Cl. 429-50.000.

Best, Walter E. Cable lock. 4,075,878, Cl. 70-49.000.

Bestard, Thomas L., to Eaton Yale Ltd. Energy saving tree harvester. 4,076,060, Cl. 144-3.00D.

Bethlehem Steel Corporation: *See—*
Gault, Robert H., 4,076,218, Cl. 254-178.000.

Bette, Joseph A., to Universal Construction Industries, Inc. Solar heating system. 4,076,013, Cl. 126-270.000.

Bettini, Francesco: *See—*
Azzalin, Bruno; and Bettini, Francesco, 4,076,160, Cl. 226-82.000.

Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., to Canada Packers Limited. Control of nitrosamine formation in nitrite cured meat. 4,076,849, Cl. 426-266.000.

BICC Limited: *See—*
Slaughter, Raymond Jeffrey, 4,076,376, Cl. 350-96.210.

Bideau, Jean; Levy, Jacques; and Viaud, Jean-Luc, to Commissariat a l'Energie Atomique. Nuclear reactor of the pressurized water type. 4,076,586, Cl. 176-78.000.

Bien, Dorothee: *See—*
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased; Bien, Gabriele; and Bien, Dorothee, 4,076,736, Cl. 260-382.000.

Bien, Else, nee Geriche, heiress: *See—*
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased; Bien, Gabriele; and Bien, Dorothee, 4,076,736, Cl. 260-382.000.

Bien, Gabriele: *See—*
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased; Bien, Gabriele; and Bien, Dorothee, 4,076,736, Cl. 260-382.000.

Bien, Hans-Samuel, deceased: *See—*
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased; Bien, Gabriele; and Bien, Dorothee, 4,076,736, Cl. 260-382.000.

Bienholz, Siegfried Heinz. Print medium and assembly. 4,075,945, Cl. 101-111.000.

Bienvenu, Jacques Michel Jean: *See—*
Appell, Marc; Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Lepicard, Georges, 4,077,058, Cl. 364-200.000.

Bill, Roland F.; Prohaska, Edward G.; and Wabel, Bernard A., to Caterpillar Tractor Co. Prepared joint for a tube fitting. 4,076,287, Cl. 285-382.400.

Billington, Colin: *See—*
Mellor, James Robert; and Billington, Colin, 4,076,512, Cl. 65-29.000.

Bilson, Edward A., to Inspiration Consolidated Copper Company. Dichromate leach of copper anode slimes. 4,076,605, Cl. 204-108.000.

Binder, Dieter: *See—*
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, 4,076,709, Cl. 544-48.000.

Binge, Derek Sidney, to RCA Corporation. Spacecraft component rotation means. 4,076,191, Cl. 244-173.000.

Bird, John M.: *See—*
Sudworth, James L.; and Bird, John M., 4,076,903, Cl. 429-104.000.

Bishop, Burton DeWolfe; and Murray, Lawrence E., to Dresser Industries, Inc. Safety latch for automotive hoists. 4,076,104, Cl. 187-8.500.

Bishop, Thomas R.: *See—*
Slator, Damon T.; Peil, Archie W.; and Bishop, Thomas R., 4,076,436, Cl. 403-343.000.

Bishop, Walton B., to United States of America, Navy. Secure position identity and time reporting system. 4,077,005, Cl. 325-32.000.

Bitonti, Paul A., to Ross Operating Valve Company. Safety valve for fluid systems. 4,075,928, Cl. 91-29.000.

Bittler, Rolf: *See—*
Hetzel, Eckard; Koehler, Waldemar; Vock, Georg Friedrich; and Bittler, Rolf, 4,076,577, Cl. 159-47.00R.

Bizzarri, Cesare, to Elettrocarbonium S.p.A. Cathode in cells for producing aluminium by electrolysis of smelted salts thereof. 4,076,610, Cl. 204-290.00R.

Blake, Charles H.; and Wood, Donald H., to Outboard Marine Corporation. Speed selection for a direct current permanent magnet motor. 4,075,970, Cl. 115-18.00E.

Blaylock, John A. Honing tool. 4,075,794, Cl. 51-340.000.

Bleiler, Kenneth W.: *See—*
Zavitsanos, Peter D.; and Bleiler, Kenneth W., 4,076,607, Cl. 204-162.00R.

Bloomfield, Jordan J.: *See—*
Owsley, Dennis C.; and Bloomfield, Jordan J., 4,076,758, Cl. 260-618.00R.

Blosser, William Ivan: *See—*
Kobeski, Walter Dan; Srocki, Sigismund Walter; Blosser, William Ivan; and Needham, James Joseph, 4,076,862, Cl. 427-136.000.

BOC International Limited: *See—*
Fitsall, Robert Alan, 4,075,869, Cl. 62-374.000.

Bock, Edward C., to Xerox Corporation. Zoom lens mount and mechanism. 4,076,389, Cl. 350-187.000.

Bodenseewerk Geratetechnik GmbH: *See*—
Krogmann, Uwe; and Wurditsch, Uwe, 4,075,764, Cl. 33-324.000.
Bodner, Ronald Eugene; and Kiscaden, Richard Craig, to International Business Machines Corporation. Asymmetrical multiprocessor system. 4,077,060, Cl. 364-200.000.
Boehme, Robert Emerson; and Murphy, Clarence Rhodes, to Gulf Oil Corporation. Process for dissolving high molecular weight olefin polymers in liquid hydrocarbons. 4,076,681, Cl. 260-33.6PQ.
Boehringer Mannheim GmbH: *See*—
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.
Boeing Company, The: *See*—
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Boesch, Roger, to Rhone-Poulenc Industries. Anthelmintic oxadiazolinone derivatives. 4,076,824, Cl. 424-272.000.
Boger, Manfred; and Drabek, Jozef, to Ciba-Geigy Corporation. Pesticidal formamidine compounds. 4,076,837, Cl. 424-304.000.
Bohner, Beat; Dawes, Dag; and Meyer, Willy, to Ciba-Geigy Corporation. Process for the production of 3-hydroxy-1,2,4-triazole derivatives. 4,076,938, Cl. 544-132.000.
Bolleter, Ulrich; and Brugger, Marcel, to Sulzer Brothers Limited. Sley drive for a weaving machine. 4,076,048, Cl. 139-190.000.
Bolling, Donald Louis: *See*—
Power, George Edward; and Bolling, Donald Louis, 4,076,666, Cl. 260-22.0CB.
Bolon, Donald A.: *See*—
Schroeter, Siegfried H.; Bolon, Donald A.; and Lucas, Gary M., 4,076,489, Cl. 431-94.000.
Boltswitch Inc.: *See*—
Erickson, John W., 4,076,368, Cl. 339-214.00R.
Bongiovanni, John P. Building panel with attached sealing means. 4,075,805, Cl. 52-309.120.
Bordet, Philippe: *See*—
Le Mehaute, Alain; and Bordet, Philippe, 4,076,900, Cl. 429-49.000.
Borg-Warner Corporation: *See*—
Fogelberg, Mark John, 4,076,108, Cl. 192-35.000.
Wills, Frank E., 4,075,865, Cl. 62-183.000.
Born, Ellis H.: *See*—
Adams, Cecil E.; Dillon, Leo H.; Born, Ellis H.; and Thurston, David L., 4,076,459, Cl. 417-217.000.
Boroschewski, Gerhard; and Arndt, Friedrich, to Schering Aktiengesellschaft. Substituted phenyl thiocarbamates with herbicidal action and method for their production. 4,076,518, Cl. 71-100.000.
Bos, Andre, to Technal International S.A. Tie members for angled joints. 4,076,438, Cl. 403-402.000.
Bosch, Erhard: *See*—
Roth, Michael; and Bosch, Erhard, 4,076,868, Cl. 427-348.000.
Boszak, Ronald J.: *See*—
Schlesinger, Sheldon Irwin; and Boszak, Ronald J., 4,076,536, Cl. 96-75.000.
Bottazzi, Andrea: *See*—
Garzia, Aldo; Ferrari, William; and Bottazzi, Andrea, 4,076,815, Cl. 424-251.000.
Boutcher, Andrew Graham: *See*—
Ross, Milton Dean; Boutcher, Andrew Graham; and Shatto, Walter Clifton, 4,076,365, Cl. 339-107.000.
Bovo, Amilcare; and Valsecchi, Giuseppe, to Societa Italiana Telecomunicazioni Siemens S.p.A. Method of and system for handling conference calls in digital telephone exchange. 4,076,966, Cl. 179-18.0BC.
Bowen Tools, Inc.: *See*—
Slator, Damon T.; Peil, Archie W.; and Bishop, Thomas R., 4,076,436, Cl. 403-343.000.
Bowles, Alfred H. Foot tension relaxer. 4,076,876, Cl. 428-71.000.
Boxhorn, George R.: *See*—
Charchian, Loris J.; Marvin, Larry E.; and Boxhorn, George R., 4,075,902, Cl. 74-230.17C.
Boyd, Gary Delane; and Thurston, Robert Norton, to Bell Telephone Laboratories, Incorporated. Elastic waveguide. 4,077,023, Cl. 333-30.00R.
Brace, Neal O., to Ciba-Geigy Corporation. Perfluoroalkylthio norbornane compounds. 4,076,740, Cl. 260-455.00R.
Bradford Noveity Co., Inc.: *See*—
Burnbaum, Jack, 4,076,234, Cl. 272-15.000.
Bradley, Rex L. Method and apparatus for testing the effect of various antibiotics on a bacterial suspension. 4,076,592, Cl. 195-103.50K.
Brahm, Jacques; and Mulders, Julien, to Solvay & Cie. Pre-mixes intended to be added to detergent powders by post-addition. 4,076,643, Cl. 252-89.00R.
Brammall, Inc.: *See*—
Van Gompel, James, 4,075,877, Cl. 70-34.000.
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, to Robert Bosch GmbH. Method of making distributor assembly bearing structures and the like. 4,075,752, Cl. 29-434.000.
Braun Aktiengesellschaft: *See*—
Mohr, Walter, 4,076,491, Cl. 431-130.000.
Schlei, Rudolf, 4,076,399, Cl. 353-86.000.
Braun, Werner; Decker, Gernot; and Rohr, Horst, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Holographic recording material for infrared radiation. 4,076,371, Cl. 350-3.610.
Bray, Robert John, to Proven Environmental Products, Inc. Pneumatic braking system for tractor-trailer combinations. 4,076,325, Cl. 303-7.000.
Brems, John Henry. Drive mechanism for reciprocating and multiple step index devices. 4,075,911, Cl. 74-816.000.
Brennan, Thomas M.; and Burley, Robert M., to Baird-Atomic, Inc. Fiber optic bundle beam expander with image intensifier. 4,076,978, Cl. 250-213.0VT.
Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Toy rocket with pneumatic launcher. 4,076,006, Cl. 124-64.000.
Brett, Peter James Douglas Victor: *See*—
Barter, Frederick William; and Brett, Peter James Douglas Victor, 4,076,791, Cl. 264-272.000.
Breuer, Oswald: *See*—
Hauschopp, Alois; and Breuer, Oswald, 4,076,318, Cl. 299-91.000.
Bridger, Robert F.; and Cier, Ronald J., to Mobil Oil Corporation. Lubricant compositions. 4,076,639, Cl. 252-47.500.
Bridgestone Tire Company Limited: *See*—
Nakashima, Katsutoshi; Kita, Toshio; Osawa, Ryuzo; and Hatanaka, Takashi, 4,076,220, Cl. 366-69.000.
Yukuta, Toshio; Ohashi, Takashi; Kojima, Minoru; and Suzuki, Akira, 4,076,654, Cl. 260-2.5AM.
Bright, Alan, to Rohm and Haas Company. Fast curing resinous compositions. 4,076,671, Cl. 260-28.5AV.
Bright Star Industries, Inc.: *See*—
Oswald, Anton H.; and Peters, John, 4,076,907, Cl. 429-133.000.
Brikenshtein, Khaim-Mordkhe Aronovich: *See*—
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.
Brink, David L., to University of California, The Regents of the. Pulping of lignocellulosic material by sequential treatment thereof with nitric oxide and oxygen. 4,076,579, Cl. 162-53.000.
Bristow, Derek John: *See*—
Bartholomew, Jack Leonard; and Bristow, Derek John, 4,075,899, Cl. 74-102.000.
British Aircraft Corporation Limited: *See*—
Baxter, Bryan Henry, 4,076,635, Cl. 252-18.000.
British Railways Board: *See*—
Sudworth, James L.; and Bird, John M., 4,076,903, Cl. 429-104.000.
British Steel Corporation: *See*—
Hague, David P.; Malkani, Dalip T.; Middlemiss, Andrew; and Scholey, Stuart, 4,075,747, Cl. 29-18.000.
Brooks, Gerald Thomas, to National Research Development Corporation. Cyclodiene insecticides. 4,076,832, Cl. 424-278.000.
Brossel, Maurice; Laurent, Gilbert; and Bertannier, Daniel, to Holzstoff. S.A.; Viafrance S.A.; and Societe Nationale Elf Aquitaine (Production) - SNEA(P). Water proofing agent. 4,076,885, Cl. 428-286.000.
Brown, Boveri-Sulzer Turbomaschinen AG: *See*—
Hartmann, Max, 4,076,452, Cl. 415-219.00R.
Brown, David C.: *See*—
Ryder, James H.; Brown, David C.; and Van Haastert, Johannes A., 4,075,714, Cl. 2-6.000.
Brown, Edmund W.: *See*—
Hedstrom, Robert E.; and Brown, Edmund W., 4,076,157, Cl. 224-42.10E.
Browne, William G.: *See*—
Zavitsanos, Peter D.; West, Martin M.; and Browne, William G., 4,076,563, Cl. 149-37.000.
Brownlee, Robert Charles, to Chrysler Corporation. Lamp socket assembly affording variable bulb focal length positioning. 4,076,359, Cl. 339-32.00R.
Brugeille, Gerard: *See*—
Taulier, Hubert Henri Leon; and Brugeille, Gerard, 4,076,587, Cl. 176-86.00R.
Brugger, Marcel: *See*—
Bolleter, Ulrich; and Brugger, Marcel, 4,076,048, Cl. 139-190.000.
Bruins, Antonius Hermanus Nicolaas Maria: *See*—
Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, 4,076,726, Cl. 260-34.50R.
Bryden, Joseph E., to Raytheon Company. Variable range marker. 4,077,037, Cl. 343-5.0EM.
Buchbinder, Arnold. Process for upgrading plywood panels. 4,076,569, Cl. 156-242.000.
Buderus'sche Eisenwerke Aktiengesellschaft: *See*—
Schreiber, Jurgen, 4,075,792, Cl. 51-165.920.
Budzich, Tadeusz. Load responsive fluid control system. 4,075,842, Cl. 60-445.000.
Buechner, Oskar: *See*—
Urban, Friedrich; Buechner, Oskar; Hartig, Ulrich; and Gropper, Hans, 4,076,919, Cl. 526-64.000.
Buelow, Hors.; Hohenschutz, Heinz; Schmidt, Johannes E.; and Sachsze, Werner, to BASF Aktiengesellschaft. Purification of formic acid by extractive distillation. 4,076,594, Cl. 203-15.000.
Buhler, Fritz, to Les Fils d'Auguste Scheuchzer S.A. Measurement of undulatory wear along railroad tracks. 4,075,888, Cl. 73-146.000.
Bulkley, Clifford T.: *See*—
Moody, Harold W., Jr.; Bulkley, Clifford T.; Gagnon, Joseph A. L. N.; and Fraser, Grover, 4,076,461, Cl. 417-310.000.
Bulwien, Hans-Dieter: *See*—
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.

Bundy, Wayne M.; Berberich, Joseph P.; and Sastre, David, to Yara Engineering Corporation. High bulking clay pigments and method of making the same. 4,076,548, Cl. 106-288.00B.
Bunker Ramo Corporation: *See—*
Pechard, Lucien Leon; and Logerot, Bernard Andre, 4,076,363, Cl. 339-91.00R.
Bunkowski, Kenneth Dana, to Formica Corporation. Paper containing rapid curing melamine-formaldehyde resin composition. 4,076,896, Cl. 428-530.000.
Burckhardt, Manfred H., to Daimler-Benz Aktiengesellschaft. Indicating arrangement for a distance warning installation. 4,075,892, Cl. 73-495.000.
Burden, Ivor R.; and Reilly, George W., to Custom Chemicides, Inc. Bee attracting composition and method of use. 4,075,783, Cl. 47-1.410.
Burge, Ralph Clarence, to Du Pont de Nemours, E. I., and Company. Scissor-type slide gate opener. 4,075,952, Cl. 105-282.00R.
Burke, Harold J., to General Motors Corporation. Double Cardan joint with elastomeric centering means. 4,075,871, Cl. 64-17.00R.
Burkhart, James H., to Diamond International Corporation. Suction roll sealing strip cleaning structure. 4,076,582, Cl. 162-272.000.
Burkholder, Nelson D., Jr., to Dow Chemical Company, The. Absorbent articles and methods for their preparation. 4,076,673, Cl. 260-29.2EP.
Burlew, Leroy Ellery: *See—*
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Burley, Robert M.: *See—*
Brennan, Thomas M.; and Burley, Robert M., 4,076,978, Cl. 250-213.0VT.
Burlington Industries, Inc.: *See—*
Harris, William Donald, 4,075,961, Cl. 112-277.000.
Burmah Oil Trading Limited: *See—*
Field, Peter Graham Spencer; and Bennett, Ronald, 4,076,759, Cl. 260-621.00C.
Burmester, Kurt: *See—*
Thurn, Friedrich; Burmester, Kurt; Pochert, Johannes; and Wolff, Siegfried, 4,076,550, Cl. 106-288.00Q.
Burnbaum, Jack, to Bradford Novelty Co., Inc. Artificial snow circulating apparatus. 4,076,234, Cl. 272-15.000.
Burnham, Robert D.: *See—*
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., 4,077,019, Cl. 331-94.50H.
Burrows, John: *See—*
Harris, Arthur; Burrows, John; and Hargreaves, James Roger, 4,076,501, Cl. 21-2.70A.
Burt, James Gordon; and Phillips, Howard Elliot, to Du Pont de Nemours, E. I., and Company. Storage stabile polyol-chlorofluoroalkane composition. 4,076,644, Cl. 252-182.000.
Burton, Duane: *See—*
Durst, David L., 4,075,981, Cl. 123-8.310.
Burton, Lawrence; and Friedman, Frank, to Immunology Research Foundation, Inc. Tumor complement fraction recovery method and product. 4,076,701, Cl. 260-112.00B.
Burton, Robert S., III: *See—*
Cha, Chang Yul; Ridley, Richard D.; and Burton, Robert S., III, 4,076,312, Cl. 299-2.000.
Burvall, Sten. Connecting element. 4,076,431, Cl. 403-171.000.
Buss, Dennis D.; and Hewes, Charles Robert, to Texas Instruments Incorporated. CCD speech processor. 4,076,960, Cl. 179-1.0SA.
Busse, Oswald; and Klesper, Hugo, to Passavant-Werke Michelbacher Hutte. Spraying apparatus for cleaning filter press plates. 4,076,033, Cl. 134-172.000.
Butterfield, Thomas T.: *See—*
Robinson, Prentice I.; and Butterfield, Thomas T., 4,076,111, Cl. 197-1.00R.
Buttriss, Albert T., to Eaton Corporation. Fastener emplacement mechanism. 4,075,748, Cl. 29-225.000.
Bybel, David; Furey, Richard F.; and Stahl, Donald P., to TII Corporation. Sonic cavitation and ozonation of waste material. 4,076,617, Cl. 210-19.000.
Byrnes, Joseph Edward, to General Electric Company. Annular cutting die, and method of circumferentially shaving away the surface portion of a rod. 4,076,441, Cl. 407-64.000.
Cachera, Pierre Charles, to Electricite de France (Service National). Method of continuous testing for leak-tightness and mechanical resistance of a reactor vessel jacket and a reactor in which said method is employed. 4,076,585, Cl. 176-38.000.
Caddock, Richard E. Apparatus for manufacturing cylindrical resistors by thick-film silk-screening. 4,075,968, Cl. 118-7.000.
Cailloux, Philippe, to Compagnie Industrielle des Telecommunications Cit-Alcatel S. A. Trunking procedure and arrangement for the connection of functional units. 4,076,967, Cl. 179-18.0AG.
Caldwell, Melvin R. Lift-jack fluid motor for hydraulic lift trucks. 4,075,931, Cl. 91-402.000.
Calkins, Thornton Ross, to General Electric Company. Heat stabilized polycarbonate resin. 4,076,686, Cl. 260-45.80A.
Calspan Corporation: *See—*
Weatherston, Roger C., 4,076,469, Cl. 418-9.000.
Calvin, Evangeline M. Attachment for human figure form. 4,076,155, Cl. 223-68.000.
Cammarata, Frank, III; Miller, Joe Alan; and Martin, Jerry D., to Baxter Travenol Laboratories, Inc. Flexible, collapsible container for liquids with improved tail seal. 4,076,063, Cl. 150-.500.
Campbell, Robert F., to Gulton Industries, Inc. Electrical connector assembly for use with remote manipulator. 4,076,361, Cl. 339-75.00M.
Campion, Ernest. Trailer hitch. 4,076,273, Cl. 280-490.00R.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
Mar, John; Garrett, Todd; and Jacques, Petrus, 4,075,725, Cl. 9-8.00R.
Canada Packers Limited: *See—*
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,076,849, Cl. 426-266.000.
Canadian Patents and Development Limited: *See—*
Puddington, Ira E.; Sparks, Bryan D.; and Sexton, Ernest A., 4,076,578, Cl. 162-5.000.
CanDu, Inc.: *See—*
Jones, John L., 4,075,785, Cl. 47-64.000.
Canon Kabushiki Kaisha: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.
Nagamatsu, Katsumi; and Saito, Takashi, 4,076,404, Cl. 355-4.000.
Tsunekawa, Tokuichi; and Taguchi, Tetsuya, 4,076,977, Cl. 250-206.000.
Carbon, Fred S. Baker for waffles, pancakes and similar food items. 4,075,940, Cl. 99-377.000.
Carbos AG: *See—*
Dahlgren, Stig Ake, 4,076,733, Cl. 260-347.900.
Caricchio, Jerome Joseph, Jr.; and York, Edward Robert, to International Business Machines Corporation. Method and composition for plating palladium. 4,076,599, Cl. 204-47.000.
Carlson, William L., Jr., to General Signal Corporation. Scotch yoke. 4,075,898, Cl. 74-89.150.
Carlsson, Per Arvid Emil; Lindberg, Per Lennart; and Wickberg, Borje Vilhelm, to Astra Lakemedel Aktiebolag. Substituted cyclopropyl benzamides and pharmaceutical preparations and methods of use employing such compounds. 4,076,840, Cl. 424-324.000.
Carnation Company: *See—*
Vander Putten, Paul R., 4,076,535, Cl. 96-67.000.
Carniglia, Stephen C.: *See—*
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Carrier Corporation: *See—*
Wright, William E., 4,076,167, Cl. 228-173.00F.
Carroll, Ronald L.; and Ziegler, John S., to American Hospital Supply Corporation. Cartridge for holding hemostatic clips. 4,076,120, Cl. 206-339.000.
Carroll S. Mohr: *See—*
Taysom, Dell A.; Taysom, Larry D.; De Witt, Robert J.; and De Witt, Carl S., 4,076,124, Cl. 209-75.000.
Carrow, Guy E.: *See—*
Scott, John N., Jr.; and Carrow, Guy E., 4,076,282, Cl. 285-156.000.
Carse, Clifford C. Multiple fluid dispenser with mechanical valve. 4,076,148, Cl. 222-144.500.
Carson, Lansing McClain; and Welter, Neil Evan, to Motorola, Inc. Dual bandwidth loop filter with sweep generator. 4,077,015, Cl. 331-4.000.
Caruso, Michael G.; and Eckert, Rene A., to Chas. S. Tanner Co. Antisoiling and antistatic textile treating composition. 4,076,631, Cl. 252-8.800.
Carver, Herbert K., Jr.; Chant, Albert H.; Hall, James F.; Hansen, Omar, Jr.; and Lord, John G., to Franklin Electric Subsidiaries, Inc. Automatic package wrapping machine. 4,075,815, Cl. 53-32.000.
Casey, Donald J.; and Gleckler, George C., to American Cyanamid Company. High molecular weight polyester resin, the method of making the same and the use thereof as a pharmaceutical composition. 4,076,798, Cl. 424-22.000.
Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, 4,076,662, Cl. 260-17.300.
Cassonnet, Jean-Claude Marcel: *See—*
Appell, Marc; Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Lepicard, Georges, 4,077,058, Cl. 364-200.000.
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Catenacci, Gerald Anthony. Slip form for concrete. 4,076,474, Cl. 425-64.000.
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Behrends, Bertwin E.; Hoehn, Richard F.; and Poirot, James M., 4,076,219, Cl. 254-187.400.
Bentz, Erwin John Herman, 4,076,072, Cl. 165-41.000.
Bill, Roland F.; Prohaska, Edward G.; and Wabel, Bernard A., 4,076,287, Cl. 285-382.400.
Davis, Warren W.; and Thompson, Leroy R., 4,075,910, Cl. 74-785.000.
Feucht, Dennis D.; and Ryan, Terry W., 4,076,194, Cl. 248-9.000.
Forster, Kevin George; and Reinsma, Harold Lawrence, 4,076,345, Cl. 308-120.00A.
Johnson, David G.; and Mueller, James P., 4,076,329, Cl. 303-56.000.
Kirchgessner, Edwin M.; and Krohn, Dennis G., 4,075,984, Cl. 123-41.540.
Koch, Franklin O., Jr., 4,075,893, Cl. 74-3.000.
Kroth, Neil W., 4,076,323, Cl. 303-6.00R.
Kroth, Neil W., 4,076,324, Cl. 303-6.00R.
Proksch, Frederick D., 4,076,099, Cl. 181-264.000.
Schimpf, James E.; and Shuler, Lucien B., 4,075,906, Cl. 74-513.000.

Therkildsen, Henry T., 4,075,894, Cl. 74-15.690.
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Cavell, Raymond J., to General Motors Corporation. Apparatus for closing an article wrapper. 4,075,821, Cl. 53-376.000.
Celanese Corporation: *See—*
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Centralna Laboratoria Po Physiko-Chimicheska Mechanika pri Ban: *See—*
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Wichterle, Otto; and Coupek, Jiri, 4,076,691, Cl. 260-47.0UA.
Cha, Chang Yul; Ridley, Richard D.; and Burton, Robert S., III, to Occidental Oil Shale, Inc. Method and apparatus for retorting oil shale at subatmospheric pressure. 4,076,312, Cl. 299-2.000.
Chair-E-Yacht, Inc.: *See—*
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Chambers, Ramon P.: *See—*
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., 4,077,016, Cl. 331-4.000.
Chambley, Phillip W.: *See—*
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Champion International Corporation: *See—*
Norris, Alan H.; and Chambley, Phillip W., 4,075,745, Cl. 28-243.000.
Theno, Mark Henry, 4,076,895, Cl. 428-516.000.
Zimmerman, Herbert E., 4,075,804, Cl. 52-232.000.
Champion Products Inc.: *See—*
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Chan, Ka-Kong; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Synthesis of vitamin E. 4,076,739, Cl. 260-410.90R.
Chang, Clarence D.; and Silvestri, Anthony J., to Mobil Oil Corporation. Process for the manufacture of gasoline. 4,076,761, Cl. 260-668.00R.
Chang, Kenneth, to International Business Machines Corporation. Integrated fabrication method of forming connectors through insulative layers. 4,076,575, Cl. 156-656.000.
Chang, Mike F.; Anthony, Thomas R.; and Cline, Harvey E., to General Electric Company. Temperature gradient zone melting through an oxide layer. 4,076,559, Cl. 148-1.500.
Chang, Richard Shih-Teng: *See—*
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Charchian, Loris J.; Marvin, Larry E.; and Boxhorn, George R., to Dana Corporation. Variable speed pulley. 4,075,902, Cl. 74-230.17C.
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Charney, William, to Schering Corporation. Process for the production of dihydroxyacetone. 4,076,589, Cl. 195-49.000.
Chateau, Georges M.; and Desai, Praful, to Societe Nationale Elf Aquitaine (Production). Laterally engageable flowline connector device. 4,076,278, Cl. 285-18.000.
Chatterley, James P., to General Motors Corporation. Self steering trailer arrangement. 4,076,264, Cl. 280-81.00A.
Chekirda, Russell F.; and Murphy, Randall T., to Lear Siegler, Inc. Seat recliner including adjustment mechanism and latch. 4,076,309, Cl. 297-363.000.
Chen, Schoen-nan, to Optel Corporation; and Grumman Aerospace Corporation. Solid state photogalvanic device utilizing sea water as an electrolyte. 4,076,904, Cl. 429-111.000.
Cherubim, Martin; Heinemann, Karl-Heinz; and Josten, Friedrich, to Deutsche Texaco Aktiengesellschaft. Molding compositions or masses suitable for manufacturing foundry molds and cores using the cold box method. 4,076,683, Cl. 260-37.00N.
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Chierici, Osvaldo F.; and Murphy, Richard F., to Holland Company. Self lubricating center bearing liner. 4,075,951, Cl. 105-199.00C.
Childress, Ray. Drill steel holder. 4,076,337, Cl. 308-3.900.
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Christensen, Burton A.; Morin, Robert B.; and Walton, Edward, to Merck & Co., Inc. 3-(β-Hydroxyethylidene)-6-(α-Hydroxyethyl)-7-oxo-4-oxaazabicyclo[3.2.0]heptene-2-carboxylic acid and derivatives thereof. 4,076,826, Cl. 424-272.000.
Christensen, Frederich M. Debris separator for hot gas stream. 4,076,508, Cl. 55-309.000.
Christianson, Raymond A. Pilot valve operated demand regulator for a breathing apparatus. 4,076,041, Cl. 137-490.000.
Christopher, Walter S., to Chicago Lock Co. Multiple function plate tumbler-type cylinder lock mechanism. 4,075,879, Cl. 70-337.000.
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Chu, Chang K.; Bartko, John; and Felice, Patrick E., to Westinghouse Electric Corporation. Irradiation for rapid turn-off reverse blocking diode thyristor. 4,076,555, Cl. 148-1.500.
Chulay, Steven John; and Grilli, Victor John, to Beckman Instruments, Inc. Tube cap assembly for preparative centrifuge rotors. 4,076,170, Cl. 233-26.000.
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Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich. Hole reamer. 4,076,087, Cl. 175-334.000.
Ciba-Geigy AG: *See—*
Lamb, Frank; Combey, Malcolm; and Cooper, Hugh Melvin, 4,076,678, Cl. 260-31.600.
Seha, Zdenek, 4,076,735, Cl. 260-378.000.
Smith, Norman Alfred, 4,076,538, Cl. 96-11.000.
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Forgo, Imre; Renner, Alfred; and Schmitter, Andre, 4,076,697, Cl. 260-78.0UA.
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Harris, Arthur; Burrows, John; and Hargreaves, James Roger, 4,076,501, Cl. 21-2.70A.
Hubele, Adolf; Kunz, Walter; and Eckhardt, Wolfgang, 4,076,836, Cl. 424-285.000.
Rosenberger, Siegfried, 4,076,690, Cl. 260-45.95D.
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Bridger, Robert F.; and Cier, Ronald J., 4,076,639, Cl. 252-47.500.
Ciganek, Engelbert, to Du Pont de Nemours, E. I., and Company. Alkylmethanodibenzocycloheptapyrroles. 4,076,830, Cl. 424-274.000.
Cimarusti, Christopher M.: *See—*
Hauck, Frederic Peter; Cimarusti, Christopher M.; and Sundeen, Joseph E., 4,076,843, Cl. 424-330.000.
Cincinnati Milacron, Inc.: *See—*
Cox, Joseph Henry, Jr.; and Haggerty, William Andrew, 4,076,442, Cl. 408-8.000.
Willer, Sharon Gail; Yust, Paul Ronald; and Kelly, Ralph, 4,076,799, Cl. 424-45.000.
Cistola, Anthony Bartholemew, to International Business Machines Corporation. Laminated programmable microstrip interconnector. 4,076,357, Cl. 339-17.00M.
Citizen Watch Co., Ltd.: *See—*
Murakami, Tomomi; Yoshida, Masaru; Kimura, Satoshi; Yasuda, Tetuya; and Iinuma, Yoshio, 4,075,825, Cl. 58-23.00R.
Yoshida, Makoto; Mochizuki, Yoshifumi; Yamauchi, Masamichi; and Kawashima, Hideyuki, 4,075,827, Cl. 58-23.0AC.
Clampitt, Richard L., to Phillips Petroleum Company. Drilling fluid compositions and methods of preparing same. 4,076,628, Cl. 252-8.50C.
Clarebout, Pierre M.: *See—*
Vanhoof, Pierre M.; and Clarebout, Pierre M., 4,076,833, Cl. 424-282.000.
Clarenz, Werner: *See—*
Zecher, Wilfried; Clarenz, Werner; and Merten, Rudolf, 4,076,694, Cl. 260-77.5MA.

Clark, Barry Frederick. Drill sampling diversion unit. 4,076,085, Cl. 175-210.000.

Clark Equipment Company: *See*—
Hushower, Richard R.; and Daresh, George M., 4,076,096, Cl. 180-133.000.
Jesswein, Ronald M., 4,075,840, Cl. 60-422.000.

Clark, Franklin D.: *See*—
Mahl, Harry L., Jr.; and Clark, Franklin D., 4,076,773, Cl. 264-3.00E.

Clark, Gary T., to Eastman Kodak Company. Disperse dyes from 2-cyano-4,6-dinitroaniline and selected 2(2'-alkoxy-5'-acylamidoanilino)alkanes. 4,076,706, Cl. 260-207.000.

Clarke, John William, to Eli Lilly and Company. Packaging tray for a videodisc. 4,076,119, Cl. 206-309.000.

Clarke, Thomas Lowe. Augmented passive radiator loudspeaker. 4,076,097, Cl. 181-147.000.

Clarkson, Douglas Mel: *See*—
Zakrzewski, Andrew Steven; Eastman, Roderick William; Ashby, George Steven; and Clarkson, Douglas Mel, 4,075,810, Cl. 52-585.000.

Clay, Frank M.; Moran, Leland G.; and Lawyer, Russell R., to Owens-Corning Fiberglas Corporation. Method of making foam pipe insulation including controlling rate of product draw-off according to foam temperature. 4,076,781, Cl. 264-40.700.

Clayton, A. Wiley, to Clayton, A. Wiley. Apparatus for curtain coating objects. 4,075,976, Cl. 118-324.000.

Clayton, William J.; Olson, Robert H.; and Kutniewski, Donald F., to Mobil Oil Corporation. Reinforced thin wall plastic bag, and method and apparatus to make material for such bags. 4,076,121, Cl. 206-390.000.

Clegg, Gordon Alexander: *See*—
Culpin, Barry; and Clegg, Gordon Alexander, 4,076,058, Cl. 141-1.100.

Cline, Harvey E.: *See*—
Chang, Mike F.; Anthony, Thomas R.; and Cline, Harvey E., 4,076,559, Cl. 148-1.500.

Clouth Gummiwerke Aktiengesellschaft: *See*—
Sperner, Peter, 4,076,434, Cl. 403-224.000.

Coats & Clark, Inc.: *See*—
Johnson, Joe, Jr., 4,075,942, Cl. 100-42.000.

Coggin, Charles H., Jr., to Kaiser Glass Fiber Corporation. Precision winder for drawing and packaging synthetic fibers. 4,076,181, Cl. 242-18.00G.

Cole, Henry B., to American Optical Corporation. Tapered fiber optic array. 4,076,378, Cl. 350-96.240.

Coleman Company, Inc., The: *See*—
Tschoop, Lincoln Paul; and Steiner, Marcel Alfred, 4,075,751, Cl. 29-432.100.

Collins, Robert F., to Kendall Company, The. Disposable garment with retained belt assembly. 4,075,716, Cl. 2-114.000.

Collumber, Ronald E. Connector tool apparatus for ceiling clips. 4,075,750, Cl. 29-278.000.

Colly, Pierre. Double-acting jack having a position stop. 4,076,214, Cl. 254-93.00R.

Combey, Malcolm: *See*—
Lamb, Frank; Combey, Malcolm; and Cooper, Hugh Melvin, 4,076,678, Cl. 260-31.600.

Commissariat a l'Energie Atomique: *See*—
Bideau, Jean; Levy, Jacques; and Viaud, Jean-Luc, 4,076,586, Cl. 176-78.000.

Compagnie Generale d'Electricite S.A.: *See*—
Le Mehaute, Alain; and Bordet, Philippe, 4,076,900, Cl. 429-49.000.

Compagnie Generale des Etablissements Michelin: *See*—
Verdier, Henri, 4,076,066, Cl. 152-354.00R.

Compagnie Honeywell Bull: *See*—
Appell, Marc; Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Lepicard, Georges, 4,077,058, Cl. 364-200.000.

Compagnie Industrielle des Telecommunications Cit-Alcatel S. A.: *See*—
Cailloux, Philippe, 4,076,967, Cl. 179-18.0AG.

Concept Inc.: *See*—
Simmons, Raymond W., 4,076,028, Cl. 128-303.130.

Conley, Dwain D., to Primark Corporation. Self-indexing label marking gun. 4,075,944, Cl. 101-94.000.

Conner, John R. Lifting mechanism for a portable dockboard. 4,075,729, Cl. 14-72.500.

Connery, James Gerard; Muly, Emil Christopher; and Taylor, Robert Morgan, to Leeds & Northrup Company. Apparatus for electrolytically determining a species in a fluid and method of use. 4,076,596, Cl. 204-1.00T.

Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, to Warner-Lambert Company. Substituted 3-(2-pyridinyl)-4(1H)-quinolinone N-oxides. 4,076,716, Cl. 260-288.0CE.

Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, to Warner-Lambert Company. 1-Substituted-2-(2-pyridinyl)ethanone N-oxides. 4,076,720, Cl. 260-296.00R.

Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, to Warner-Lambert Company. (4-Oxo-4H-1-benzopyran-3-yl)aminooxoacetic acids and their derivatives. 4,076,729, Cl. 260-345.200.

Connor, David T.; and von Strandtmann, Maximilian, to Warner-Lambert Company. Conversion of acid S, produced by the organism *Polyangium cellulosum* var. *fulvum* into acid F. 4,076,940, Cl. 542-447.000.

Conrad-Stork B.V.: *See*—
Hupkes, Leonard, 4,076,127, Cl. 212-10.000.

Control Data Corporation: *See*—
Strom, Richard Albert, 4,077,033, Cl. 340-324.00M.

Control Devices, Incorporated: *See*—
Krechel, Joseph L.; and Purvis, Michael J., 4,076,211, Cl. 251-286.000.

Controlex Corporation of America: *See*—
Schaaphok, Peter R. W., 4,075,905, Cl. 74-501.00R.

Cook, Koy B., Jr., to Harris Corporation. Self aligned gate for di-CMOS. 4,075,754, Cl. 29-571.000.

Cook, Norman J.: *See*—
Bates, A. Arthur; and Cook, Norman J., 4,075,966, Cl. 114-114.000.

Cooper, Hugh Melvin: *See*—
Lamb, Frank; Combey, Malcolm; and Cooper, Hugh Melvin, 4,076,678, Cl. 260-31.600.

Copeland, William Raeburn, to Reinforcing & Allied Industries (Proprietary) Limited. Machine for continuously cold working steel bar. 4,075,880, Cl. 72-64.000.

Copping, Bruce G. Solar heater. 4,076,026, Cl. 126-271.000.

Corain, Luciano: *See*—
Zabotin, Alexandr Alexandrovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Galperin, Alexandr Lvovich; Santucci, Nicola; and Corain, Luciano, 4,076,051, Cl. 139-436.000.

Corbin, Robert W., to Xerox Corporation. Illumination slit for and a process of use thereof in a reproducing machine. 4,076,416, Cl. 355-49.000.

Corbin, Robert W.: *See*—
Hayashi, Fujio; and Corbin, Robert W., 4,076,417, Cl. 355-60.000.

Corcoran, Jack C., to Sackner Products, Inc. Structural laminate for seating. 4,076,886, Cl. 428-294.000.

Cordes, William F., III; and Diehl, Robert E., to American Cyanamid Company. Polycarbonate stabilizers. 4,076,688, Cl. 260-45.9QA.

Cordi, Vincent A.; and Edson, Bruce A. Multi-processing system with a hierarchial memory having journaling and copyback. 4,077,059, Cl. 364-200.000.

Cornelius Company, The: *See*—
Austin, Forrest L., 4,076,207, Cl. 249-66.00R.
Zygiel, Alfred E., deceased, 4,076,145, Cl. 222-1.000.

Cornell, Thomas G., to Eaton Corporation. Adjustable steering column. 4,075,903, Cl. 74-493.000.

Corning Glass Works: *See*—
Foster, Gordon F.; Meissner, Helmuth E.; and Stiles, Janice L., 4,076,792, Cl. 423-213.500.
Joly, Pascal Adrien Jean; and Prat, Jean-Claude Alphonse Henri, 4,076,543, Cl. 106-53.000.
Kerko, David J.; and Tick, Paul A., 4,076,544, Cl. 106-54.000.

Cosden Technology, Inc.: *See*—
Medley, Ronald D.; and Chapman, James R., 4,076,570, Cl. 156-244.000.

Costin, C. Richard, to Rohm and Haas Company. Microbiocidal macroreticular ion exchange resins, their method of preparation and use. 4,076,622, Cl. 210-64.000.

Coudray, Andre Lucien: *See*—
Henrion, Michel Andre Robert; and Coudray, Andre Lucien, 4,076,964, Cl. 179-15.0BS.

Coulter Information Systems, Inc.: *See*—
Talmage, Peter Guy; and Kuehnle, Manfred Rudolf, 4,076,406, Cl. 355-10.000.

Coupek, Jiri: *See*—
Wichterle, Otto; and Coupek, Jiri, 4,076,691, Cl. 260-47.0UA.

Coventry Gauge & Tool Company Limited: *See*—
Palmer, Raymond Leslie, 4,075,790, Cl. 51-94.0CS.

Cowgill, Duane W., to Sierra Engineering Co. Helmet having anti-lift device. 4,075,715, Cl. 2-6.000.

Cox, Ian R.: *See*—
Acheson, Richard M.; Cox, Ian R.; Stubbs, John K.; and Penrose, Alexander B., 4,076,817, Cl. 424-251.000.

Cox, Joseph Henry, Jr.; and Haggerty, William Andrew, to Cincinnati Milacron, Inc. Apparatus for controlling coolant flow in accordance to external forces upon a cutting tool. 4,076,442, Cl. 408-8.000.

Crago, Terril M., to Standun, Inc. Skeleton discharge mechanism for use with cupmaker blank and draw presses and the like. 4,075,963, Cl. 113-113.00R.

Crates, Fredrick J.: *See*—
Alpers, Robert J.; Crates, Fredrick J.; Ott, Denis P.; and Schmunk, John D., 4,076,040, Cl. 137-371.000.

Crawford Fitting Co.: *See*—
Spontelli, Leonard P., 4,076,286, Cl. 285-341.000.

Crayton, Bruce E.; Wilson, James F.; and Zirngibl, Carl H., to Eastman Kodak Company. Apparatus and method for making prints. 4,076,411, Cl. 355-28.000.

Crist, Norman Benjamin. Universal recessed wall cabinet. 4,076,350, Cl. 312-242.000.

Croat, John J.: *See*—
Lee, Robert W.; and Croat, John J., 4,076,561, Cl. 148-103.000.

Croisier, Alain; and Glaise, Rene, to International Business Machines Corporation. Device for reproducing the charge stored in an input capacitor in a plurality of output capacitors. 4,076,986, Cl. 307-221.00D.

Crook, Edward J., Jr. Pin and locking collar connector for load bearing parts. 4,076,430, Cl. 403-154.000.

Cross, Charles K.: *See*—
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,076,849, Cl. 426-266.000.

Crowell, Richard T., to Du Pont de Nemours, E. I., and Company. Image anchorage in photographic films. 4,076,531, Cl. 96-35.000.

Cruchet, Claude: *See*—
Desarzens, Francis; and Cruchet, Claude, 4,076,102, Cl. 182-81.000.
Cruthers, Larry R.: *See*—
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,825, Cl. 424-273.00R.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,827, Cl. 424-273.00R.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,828, Cl. 424-273.00R.
Csajka, Istvan Peter; and Ungerboeck, Gottfried, to International Business Machines Corporation. Method and arrangement for coding binary signals and modulating a carrier signal. 4,077,021, Cl. 332-9.00R.
CSELT - Centro Studi e Laboratori Telecomunicazioni: *See*—
Dogliotti, Renato; and Mazzei, Umberto, 4,076,956, Cl. 178-88.000.
Culpin, Barry; and Clegg, Gordon Alexander, to Chloride Group Limited. Electric storage batteries. 4,076,058, Cl. 141-1.100.
Cuozzo, Benjamin D. Adjustable height manhole with locking means. 4,075,796, Cl. 52-20.000.
Custom Chemicides, Inc.: *See*—
Burden, Ivor R.; and Reilly, George W., 4,075,783, Cl. 47-1.410.
Dahlgren, Stig Ake, to Carbos AG. Process for the preparation of furfural. 4,076,733, Cl. 260-347.900.
Dahlstrom, Lars; and Nilsson, Bengt, to Allmanna Svenska Elektriska Aktiebolaget. Industrial robot. 4,076,131, Cl. 214-1.0BC.
Daido-Maruta Finishing Co. Ltd.: *See*—
Yamamoto, Kazuhide, 4,076,870, Cl. 427-390.00C.
Daimler-Benz Aktiengesellschaft: *See*—
Burckhardt, Manfred H., 4,075,892, Cl. 73-495.000.
Daisley, Robert Thomas; and Chumley, David Charles Philip, to Molins Limited. Apparatus for handling rod-like articles. 4,076,115, Cl. 198-487.000.
Dalton, Robert D. Bait casting float. 4,075,777, Cl. 43-41.200.
Dalton, Thomas B., to Westran Corporation. Detachable truck body. 4,076,299, Cl. 296-35.00A.
Dana Corporation: *See*—
Charchian, Loris J.; Marvin, Larry E.; and Boxhorn, George R., 4,075,902, Cl. 74-230.17C.
Danfoss A/S: *See*—
Larsen, Peder, 4,076,042, Cl. 137-494.000.
D'Angelo, Joe B. Automatic safety brake system. 4,076,326, Cl. 303-18.000.
Daniels, Norman F.: *See*—
Bernier, Harold J.; and Daniels, Norman F., 4,076,252, Cl. 273-141.00R.
Danis, Louis J., to Eaton Corporation. Hard facing alloy for engine valves and the like. 4,075,999, Cl. 123-191.00A.
Darack, John R.: *See*—
Nickerson, John T. R.; and Darack, John R., 4,076,850, Cl. 426-332.000.
Daresh, George M.: *See*—
Hushower, Richard R.; and Daresh, George M., 4,076,096, Cl. 180-133.000.
Dart Industries Inc.: *See*—
Rogan, John, 4,076,043, Cl. 137-539.500.
Daster, Oskar. Sheet-supporting device. 4,075,773, Cl. 40-11.00R.
Datta, Ranajit K., to General Electric Company. Sealing materials for ceramic envelopes. 4,076,991, Cl. 313-220.000.
Davidson, John Richard, to Motorola, Inc. Diode feedback monostable multivibrator in a transistor ignition system. 4,076,997, Cl. 315-209.00T.
Davies, Charles Bloor; Davies, James Francis; and Neillie, William Frederick Soutar, to Lever Brothers Company. Detergent compositions. 4,076,653, Cl. 252-532.000.
Davies, James Francis: *See*—
Davies, Charles Bloor; Davies, James Francis; and Neillie, William Frederick Soutar, 4,076,653, Cl. 252-532.000.
Davies, Ronald L.: *See*—
Friedrich, Jan L.; and Davies, Ronald L., 4,075,978, Cl. 122-33.000.
Davis, David R. Table game. 4,076,243, Cl. 273-85.00E.
Davis, George G., to Frigitemp. Oil impervious acoustical board. 4,076,100, Cl. 181-290.000.
Davis, James E., to Procter & Gamble Company, The. Fabric softener. 4,076,632, Cl. 252-8.800.
Davis, Lynn M.: *See*—
Theis, James V., Jr.; Davis, Lynn M.; and Moss, Donald H., 4,076,449, Cl. 415-18.000.
Davis, Noel; Haub, John T.; and Rustad, Stanley C., to General Mills, Inc. Cart pushing apparatus. 4,075,949, Cl. 104-162.000.
Davis, Paul, to Sweetheart Plastics, Inc. Disposable plastic lid. 4,076,123, Cl. 206-503.000.
Davis, Raymond Vincent, to Hoffmann-La Roche Inc. Radioimmunoassay. 4,076,797, Cl. 424-1.000.
Davis, Samuel H. Bell fitting and support assembly for pipe. 4,076,281, Cl. 285-64.000.
Davis, Thomas Francis: *See*—
Lerner, Lewis Brian; and Davis, Thomas Francis, 4,076,598, Cl. 204-43.00G.
Davis, Warren W.; and Thompson, Leroy R., to Caterpillar Tractor Co. Overload safety device for gas turbine engines. 4,075,910, Cl. 74-785.000.
Davydenko, Eduard Prokofievich: *See*—
Ioffe, Benyamin Alexandrovich; Kalnin, Robert Karlovich; Zommer, Jury Arvidovich; Graubin, Yanis Ekabovich; Davydenko, Eduard Prokofievich; and Kern, Ivan Ivanovich, 4,077,027, Cl. 335-219.000.
Dawes, Dag: *See*—
Bohner, Beat; Dawes, Dag; and Meyer, Willy, 4,076,938, Cl. 544-132.000.
Day, Bernard L. Perpetual calendar. 4,075,774, Cl. 40-109.000.
Dayco Corporation: *See*—
Frisch, Paul P., 4,076,035, Cl. 137-601.000.
Meek, Lennis E., 4,076,347, Cl. 308-238.000.
Deakin, James E. Automatic shaft balancer. 4,075,909, Cl. 74-573.00R.
Deaton, Guy W. Barbecue apparatus and method. 4,076,008, Cl. 126-25.00R.
DeBell & Richardson, Inc.: *See*—
White, LeRoy A.; and Holley, William H., 4,076,656, Cl. 260-2.50M.
Decca Limited: *See*—
Plows, Graham Stuart; and Castle, Paul, 4,075,974, Cl. 118-52.000.
Decker, Gernot: *See*—
Braun, Werner; Decker, Gernot; and Rohr, Horst, 4,076,371, Cl. 350-3.610.
Decombe, Robert; and Hugelin, Bernard, to Sublistatic Holding SA. Sulphurized paper supports. 4,076,495, Cl. 8-2.50A.
Deeg, Emil W.; and Krohn, David A., to American Optical Corporation. Preparation of photochromic gradient lenses of improved color. 4,076,395, Cl. 351-165.000.
Deeg, Emil W.; and Hoffman, Donald O., to American Optical Corporation. Process for producing photochromic silicate glass film containing silver halide particles. 4,076,542, Cl. 106-52.000.
Deere & Company: *See*—
Hengen, Edward John, 4,075,824, Cl. 56-14.600.
Deffayet, Jean; and Lamarque, Etienne, to Thomson-CSF. Armor piercing projectile. 4,075,946, Cl. 102-52.000.
de Larosiere de Champfeu, Pierre J., to International Synthetic Rubber Company, Ltd., The. Soil injection machine. 4,075,853, Cl. 61-36.00R.
de Limur, Eleanor. Encapsulated pulverized dehydrated fruit and vegetable product. 4,076,848, Cl. 426-89.000.
Dell, Harold R. Data compression. 4,077,034, Cl. 340-347.0DD.
Delong Corporation: *See*—
Hansen, John H., 4,075,860, Cl. 61-87.000.
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Apparatus for investigating fast chemical reactions by optical detection. 4,076,420, Cl. 356-73.000.
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., to American Home Products Corporation. Pyrano[3,4-b]-indole derivatives, pharmaceutical compositions and methods of use. 4,076,831, Cl. 424-274.000.
DeMey, Charles F., III: *See*—
Atwood, John G.; DeMey, Charles F., III; Marshall, Hamilton W., Jr.; and Ducret, Lucien C., 4,076,503, Cl. 23-259.000.
Deml, Reinhold; Greis, Ulrich; Hofmann, Wilfried; and Rauffer, Walter, to AGFA-Gevaert, A.G. Rear-projection viewing screen. 4,076,384, Cl. 350-122.000.
Demuth, Hans; and Ferreira, Jose R. A., to Sulzer Brothers Limited. System for transferring a yarn from one part of a textile machine to another part. 4,076,052, Cl. 139-439.000.
Denisselle, Jean: *See*—
Efther, Jean; and Denisselle, Jean, 4,076,972, Cl. 200-33.00A.
Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Derivatives of pyrazolo[1,5-a]pyrido[2,3-d]pyrimidin-9(4H)-one. 4,076,712, Cl. 260-256.40F.
Dergachev, Nikolai Makarovich: *See*—
Lifshits, Viktor Senderovich; Sukhanov, Alexandr Alexandrovich; Dergachev, Nikolai Makarovich; Pevnev, Arkady Alexeevich; Baranov, Vladimir Nikitich; and Shklyanov, Leonid Pavlovich, 4,076,973, Cl. 219-97.000.
Desai, Praful: *See*—
Chateau, Georges M.; and Desai, Praful, 4,076,278, Cl. 285-18.000.
Desarzens, Francis; and Cruchet, Claude, to Arcia SA. Trap door and folding ladder arrangement. 4,076,102, Cl. 182-81.000.
DeSoto, Inc.: *See*—
Sekmakas, Kazys, 4,076,677, Cl. 260-29.60E.
Dessau, Ralph M., to Mobil Oil Corporation. Coal desulfurization process. 4,076,505, Cl. 44-1.00R.
Deucher, Conrad, to Valutec AG. Erecting seat structure to assist invalids from seated to standing, upright position, particularly erecting wheelchairs. 4,076,304, Cl. 297-45.000.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Thurn, Friedrich; Burmester, Kurt; Pochert, Johannes; and Wolff, Siegfried, 4,076,550, Cl. 106-288.00Q.
Deutsche Texaco Aktiengesellschaft: *See*—
Cherubim, Martin; Heinemann, Karl-Heinz; and Josten, Friedrich, 4,076,683, Cl. 260-37.00N.
DeVale, Donald P.: *See*—
Alms, Erhardt E.; DeVale, Donald P.; and Russell, William, 4,076,492, Cl. 432-43.000.
Deventer, Gert, to Deventer KG. Sliding seal. 4,076,262, Cl. 277-227.000.
Deventer KG: *See*—
Deventer, Gert, 4,076,262, Cl. 277-227.000.
DeVlieg, Garrett Howard, to Boeing Company, The. Aircraft automatic braking system. 4,076,331, Cl. 303-93.000.
De Witt, Carl S.: *See*—
Taysom, Dell A.; Taysom, Larry D.; De Witt, Robert J.; and De Witt, Carl S., 4,076,124, Cl. 209-75.000.

De Witt, Robert J.: *See—*
Taysom, Dell A.; Taysom, Larry D.; De Witt, Robert J.; and De Witt, Carl S., 4,076,124, Cl. 209-75.000.

Dholakia, Anil Ramniklal, to RCA Corporation. Video disc player employing a spring loaded stylus apparatus. 4,077,050, Cl. 358-128.000.

Diamond International Corporation: *See—*
Burkhart, James H., 4,076,582, Cl. 162-272.000.

Diamond Power Specialty Corporation: *See—*
Raas, Jean H.; and Schwartz, Joseph I., 4,076,144, Cl. 220-367.000.

Didrickson, Donald D. Rotary airlock having adjustable blades to maintain a seal. 4,076,150, Cl. 222-368.000.

Dieck, Ronald L.; and Quinn, Edwin J., to Armstrong Cork Company. Poly(aryloxyphosphazene) copolymer foams. 4,076,658, Cl. 260-2.50R.

Diehl, Francis L.: *See—*
Edwards, James B.; and Diehl, Francis L., 4,076,633, Cl. 252-8.750.

Diehl, Robert E.: *See—*
Cordes, William F., III; and Diehl, Robert E., 4,076,688, Cl. 260-45.9QA.

Diesinger, Walter Helmut; and Kosiolek, Klaus Peter, to Dynamit Nobel Aktiengesellschaft. Partition for rocket motors. 4,075,832, Cl. 60-245.000.

Dietmann, Karl: *See—*
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.

Dietz, Klaus: *See—*
Vogel, Eberhard; Glaser, Herbert; Kleider, Albert; and Dietz, Klaus, 4,075,793, Cl. 51-170.0TL.

Dillon, Leo H.: *See—*
Adams, Cecil E.; Dillon, Leo H.; Born, Ellis H.; and Thurston, David L., 4,076,459, Cl. 417-217.000.

DiMarcello, Frank Vincent; and Williams, John Charles, to Bell Telephone Laboratories, Incorporated. Graded index optical fiber. 4,076,380, Cl. 350-96.310.

Dir, Gary A.: *See—*
Haas, Werner E. L.; and Dir, Gary A., 4,076,387, Cl. 350-362.000.

Dirigo Corporation: *See—*
Nickerson, John T. R.; and Darack, John R., 4,076,850, Cl. 426-332.000.

Distler, Dieter: *See—*
Freyberg, Peter; Horn, Dieter; Oppenlaender, Knut; Wolf, Hans; and Distler, Dieter, 4,076,497, Cl. 8-21.00C.

Ditto, Edwin D.; and Abu Akeel, A. Hadi Kobaisi, to General Motors Corporation. Energy absorbing bumper. 4,076,296, Cl. 293-71.00R.

Ditto, Edwin D., to General Motors Corporation. Programmable velocity and force control method for compression molding. 4,076,780, Cl. 264-40.500.

Ditto, Edwin D., to General Motors Corporation. Mold coating of freshly molded articles. 4,076,788, Cl. 264-255.000.

Dittrich, Ferdinand J.; and Weir, John D., to Metco, Inc. Flame-sprayable flexible wires. 4,076,883, Cl. 428-242.000.

Dively, Robert M., to Raymond Lee Organization, Inc., The, a part interest. Amusement device. 4,076,238, Cl. 273-1.00R.

Djabarov, Nikola Borissov: *See—*
Simeonov, Yordan Todorov; and Djabarov, Nikola Borissov, 4,076,546, Cl. 106-89.000.

Dobson, Thomas A.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 4,076,831, Cl. 424-274.000.

Dochterman, Richard W., to General Electric Company. Torsional vibration isolating motor mounting arrangement and method of making the same. 4,076,197, Cl. 248-15.000.

Dodich, Nicholas Anthony, to Over-Lowe Company, Inc. Pavement cutting wheel mounting for earth moving equipment. 4,076,314, Cl. 299-40.000.

Dogliotti, Renato; and Mazzei, Umberto, to CSELT - Centro Studi e Laboratori Telecomunicazioni. Decision network for receiver of PSK digital signals. 4,076,956, Cl. 178-88.000.

Dohany, Julius Eugene, to Pennwalt Corporation. Vinylidene fluoride polymer having improved melt flow properties. 4,076,929, Cl. 526-255.000.

Doherty, James T.: *See—*
Theurer, John; Beck, Orville F.; and Doherty, James T., 4,075,814, Cl. 52-79.500.

Dolhyj, Serge R.; Milberger, Ernest C.; and White, James F., to Standard Oil Company, The. Process for preparing phthalic anhydride. 4,076,731, Cl. 260-346.400.

Dominion Foundries and Steel, Limited: *See—*
Zakrzewski, Andrew Steven; Eastman, Roderick William; Ashby, George Steven; and Clarkson, Douglas Mel, 4,075,810, Cl. 52-585.000.

Doncque, Pierre M., to Agence Nationale de Valorisation de la Recherche (ANVAR). Vehicle wheel suspension device. 4,076,271, Cl. 280-284.000.

Dorph, Thor, to Lie, Bjorn; and Lie, Gina, part interest to each. Duplex spool for an open face spinning reel. 4,076,185, Cl. 242-118.410.

Dow Chemical Company, The: *See—*
Beaumont, Gerald P.; and Jones, William C., 4,076,629, Cl. 252-8.600.
Beck, Henry Nelson, 4,076,910, Cl. 526-6.000.
Burkholder, Nelson D., Jr., 4,076,673, Cl. 260-29.2EP.
Gross, James R., 4,076,928, Cl. 526-240.000.
Gulbenk, Alin H., 4,076,719, Cl. 260-296.00R.
Moore, William G., 4,076,776, Cl. 264-13.000.
Olstowski, Franciszek; and Parrish, Donald Bob, 4,076,660, Cl. 260-9.000.
Saunders, Frank L.; and Pelletier, Ronald R., 4,076,768, Cl. 260-876.00B.
Turner, Robert B., 4,076,679, Cl. 260-31.20N.
Wagner, Eugene R.; and Mueller, Larry G., 4,076,841, Cl. 424-324.000.
Wright, Donald R.; and Swartz, Henry D., 4,075,818, Cl. 53-180.00R.

Dow Corning Corporation: *See—*
Keil, Joseph W., 4,076,695, Cl. 260-77.5AM.

Dowling, Donald J.: *See—*
Arnold, Dan M.; Dowling, Donald J.; and Warren, Wayne F., 4,076,980, Cl. 250-270.000.

Downton, Denys Edward: *See—*
Lausberg, Johannes Willebrordes; and Downton, Denys Edward, 4,076,146, Cl. 222-52.000.

Doyle, Keith Gilbert: *See—*
Zolman, Peter Martin; and Doyle, Keith Gilbert, 4,076,055, Cl. 140-92.200.

Doyle, Thomas Joseph: *See—*
Mikofalvy, Bela Kalman; and Doyle, Thomas Joseph, 4,076,920, Cl. 526-74.000.

Drabek, Jozef: *See—*
Boger, Manfred; and Drabek, Jozef, 4,076,837, Cl. 424-304.000.

Drahtmuller, Hans Dieter: *See—*
Krusche, Alfred; and Drahtmuller, Hans Dieter, 4,076,090, Cl. 180-6.480.

Dremann, George H. Abrasive blast system having a modulation function. 4,075,789, Cl. 51-436.000.

Dresser Industries, Inc.: *See—*
Bishop, Burton DeWolfe; and Murray, Lawrence E., 4,076,104, Cl. 187-8.500.

Drinkard, Gary; and McLaughlin, William A., to Shell Oil Company. Process for forming a coalate solution in-situ. 4,076,078, Cl. 166-271.000.

Drwiega, Bohdan. Arrangement and method for the storage of lantern slides and projector for viewing thereof. 4,076,401, Cl. 353-108.000.

Dubovitsky, Fedor Ivanovich: *See—*
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Duchateau, Jean Louis, to Foseco Trading A.G. Tundishes. 4,076,224, Cl. 266-275.000.

Ducret, Lucien C.: *See—*
Atwood, John G.; DeMey, Charles F., III; Marshall, Hamilton W., Jr.; and Ducret, Lucien C., 4,076,503, Cl. 23-259.000.

Dudko, Daniil Andreevich: *See—*
Sur, Mikhail Danilovich; and Dudko, Daniil Andreevich, 4,076,470, Cl. 418-63.000.

Dugle, James B.; and Hager, C. Bradley, to Miles Laboratories, Inc. Method, composition, and device for determining the specific gravity of a liquid. 4,076,502, Cl. 23-230.00R.

Dummel, Fritz, to Siemens Aktiengesellschaft. Wire wrapping device for connecting an insulated electrical wire to an electrical contact pin. 4,076,056, Cl. 140-119.000.

Dunham-Bush, Inc.: *See—*
Moody, Harold W., Jr.; Bulkley, Clifford T.; Gagnon, Joseph A. L. N.; and Fraser, Grover, 4,076,461, Cl. 417-310.000.

Dunlop Limited: *See—*
Goodfellow, Anthony Gerald, 4,076,565, Cl. 156-125.000.
Yardley, James Frank; and Nightingale, Allen Frederick, 4,076,891, Cl. 428-517.000.

Du Pont de Nemours, E. I., and Company: *See—*
Anderson, Arthur William; and Stamatoff, Gelu Stoeff, 4,076,698, Cl. 260-88.20F.
Anolick, Colin; and Kutsch, Howard James, 4,076,226, Cl. 267-139.000.
Burge, Ralph Clarence, 4,075,952, Cl. 105-282.00R.
Burt, James Gordon; and Phillips, Howard Elliot, 4,076,644, Cl. 252-182.000.
Ciganek, Engelbert, 4,076,830, Cl. 424-274.000.
Crowell, Richard T., 4,076,531, Cl. 96-35.00.
Ganci, James Barry; and Mastrangelo, Sebastian V. R., 4,076,652, Cl. 252-504.000.
Ida, Edward Stanley, 4,076,424, Cl. 356-188.000.
Joiner, James Ray, Jr., 4,076,897, Cl. 428-539.000.
Kiser, Gary L.; and Hendricks, Bobby G., 4,076,754, Cl. 260-603.00C.
Kring, Elbert Victor, 4,076,899, Cl. 429-42.000.
Nazarenko, Nicholas; and Seidel, William Carl, 4,076,756, Cl. 260-606.50B.
Pagilagan, Rolando Umali, 4,076,664, Cl. 260-18.00N.
Pecoraro, Joseph Michael, 4,076,738, Cl. 260-406.000.
Simms, John Alvin, 4,076,766, Cl. 260-850.000.
Sommerfeld, Eugene G., 4,076,675, Cl. 260-29.4UA.
Sommerfeld, Eugene G., 4,076,676, Cl. 260-29.40R.
Valdsaar, Herbert, 4,076,506, Cl. 51-307.000.

Durst, David L., to Burton, Duane. Rotary internal combustion engine. 4,075,981, Cl. 123-8.310.

Durtsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Koch, Karlheinz; and Rutzen, Horst, 4,076,743, Cl. 260-501.130.

Dussia, Melvin A. Spring type back traction exerciser. 4,076,237, Cl. 272-136.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Diesinger, Walter Helmut; and Kosiolek, Klaus Peter, 4,075,832, Cl. 60-245.000.

E. D. Bullard Company: *See—*
Moretti, Anthony L., 4,076,373, Cl. 350-61.000.

E. R. Squibb & Sons, Inc.: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,076,712, Cl. 260-256.40F.
Hauck, Frederic Peter; Cimarusti, Christopher M.; and Sundeen, Joseph E., 4,076,843, Cl. 424-330.000.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,825, Cl. 424-273.00R.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,827, Cl. 424-273.00R.
Haugwitz, Rudiger D.; and Cruthers, Larry R., 4,076,828, Cl. 424-273.00R.
Vogt, B. Richard, 4,076,818, Cl. 424-251.000.
Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,076,823, Cl. 424-269.000.

E-Systems, Inc.: *See—*
Fulghum, Donald P., 4,076,958, Cl. 179-1.50A.

Eash, John William, II. Skateboard with longitudinally adjustable wheels. 4,076,265, Cl. 280-87.04A.

Eastern Cyclone Industries, Inc.: *See—*
Haight, Nicholas; and Madsen, Trygve T., 4,076,321, Cl. 302-27.000.

Easterwood, Richard L.: *See—*
Herricks, Herman H.; and Easterwood, Richard L., 4,076,079, Cl. 166-308.000.

Eastman Kodak Company: *See—*
Clark, Gary T., 4,076,706, Cl. 260-207.000.
Crayton, Bruce E.; Wilson, James F.; and Zirngibl, Carl H., 4,076,411, Cl. 355-28.000.
Fleckenstein, Lee J.; and Figueras, John, 4,076,529, Cl. 96-3.000.
Godfrey, Darryl A., 4,076,670, Cl. 260-27.00R.
Gottermeier, William F., 4,076,532, Cl. 96-48.0HD.
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 4,076,687, Cl. 260-45.8NT.
Kasper, George Philip; and May, John Walter, 4,076,857, Cl. 427-18.000.
Reid, Michael Gerald; Burlew, Leroy Ellery; and Hogan, David Charles, 4,076,408, Cl. 355-14.000.
Williams, James Ora, 4,075,977, Cl. 118-658.000.

Eastman, Roderick William: *See—*
Zakrzewski, Andrew Steven; Eastman, Roderick William; Ashby, George Steven; and Clarkson, Douglas Mel, 4,075,810, Cl. 52-585.000.

Eaton Corporation: *See—*
Buttriss, Albert T., 4,075,748, Cl. 29-225.000.
Cornell, Thomas G., 4,075,903, Cl. 74-493.000.
Danis, Louis J., 4,075,999, Cl. 123-191.00A.
Tinholt, Thomas H., 4,076,110, Cl. 192-58.00B.

Eaton Yale Ltd.: *See—*
Bestard, Thomas L., 4,076,060, Cl. 144-3.00D.

Ebner, Heinrich; and Enenkel, Anton, to Heinrich Frings, Firma. Two stage process for the production of vinegar with high acetic acid concentration. 4,076,844, Cl. 426-17.000.

Eckert, Rene A.: *See—*
Caruso, Michael G.; and Eckert, Rene A., 4,076,631, Cl. 252-8.800.

Eckhardt, Wolfgang: *See—*
Hubele, Adolf; Kunz, Walter; and Eckhardt, Wolfgang, 4,076,836, Cl. 424-285.000.

Edmunds, Donald L.: *See—*
Fulton, Robert C.; Edmunds, Donald L.; and Shields, George B., 4,076,511, Cl. 65-27.000.

Edson, Bruce A.: *See—*
Cordi, Vincent A.; and Edson, Bruce A., 4,077,059, Cl. 364-200.000.

Edwards, Clarence Roy; and Fickes, Ellwood Donald, to General Electric Company. Circuit for limiting the spindle speed of a machine. 4,076,999, Cl. 318-465.000.

Edwards, James B.; and Diehl, Francis L., to Procter & Gamble Company, The. Fabric treating articles with improved conditioning properties. 4,076,633, Cl. 252-8.750.

Effinger, Cecil S. Free platen typewriter. 4,076,112, Cl. 197-127.00R.

Efther, Jean; and Denisselle, Jean. Liquid contact switch having plural compartments and electrical heater. 4,076,972, Cl. 200-33.00A.

Egerer, Josef, to Staedtler & UHL. Circular comb for combing machines. 4,075,738, Cl. 19-234.000.

Ehrmann, Karl: *See—*
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Eichenseer, Franz; Steidl, Dieter; and Muller, Walter, to Hoechst Aktiengesellschaft. Grinding method for cellulose. 4,076,935, Cl. 536-86.000.

Eickmann, Karl. Rotor, pistons, piston shoes and associated means in fluid handling devices. 4,075,932, Cl. 91-488.000.

El Paso Products Company: *See—*
Mims, Samuel S., 4,076,948, Cl. 560-191.000.

Elco Corporation: *See—*
Sochor, Jerzy R., 4,075,759, Cl. 29-629.000.

Electricite de France (Service National): *See—*
Cachera, Pierre Charles, 4,076,585, Cl. 176-38.000.
Taulier, Hubert Henri Leon; and Brugeille, Gerard, 4,076,587, Cl. 176-86.00R.

Elettrocarbonium S.p.A.: *See—*
Bizzarri, Cesare, 4,076,610, Cl. 204-290.00R.

Eli Lilly and Company: *See—*
Clarke, John William, 4,076,119, Cl. 206-309.000.
Shields, James E., 4,076,659, Cl. 260-8.000.

Eliott, Barbara Ann: *See—*
Teiser, Sidney; and Eliott, Floyd H., 4,076,391, Cl. 350-241.000.

Eliott, Floyd H.: *See—*
Teiser, Sidney; and Eliott, Floyd H., 4,076,391, Cl. 350-241.000.

Ellingboe, James; Nystrom, Ernst Holger; and Sjovall, Jan Bertil. Polysaccharide polyols. 4,076,930, Cl. 536-1.000.

Ellsworth, James P.: *See—*
Wilson, John T.; and Ellsworth, James P., 4,077,055, Cl. 361-46.000.

Elmer, Otto C., to General Tire & Rubber Company, The. Method for making urethane-terminated polycarbodiimides and products thereof. 4,076,945, Cl. 560-25.000.

Elsner, Burckhardt; Lagodka, Gunter; Plevak, Lubomir; and Rosenberg, Harry, to Gewerkschaft Eisenhutte Westfalia. Shield-type support assemblies for mine workings. 4,075,857, Cl. 61-45.00D.

Eltra Corporation: *See—*
Jensen, Henry E., 4,076,906, Cl. 429-90.000.

Emhart Industries, Inc.: *See—*
Raudat, John L.; and Johnson, Lloyd D., 4,075,819, Cl. 53-248.000.

EMI Limited: *See—*
LeMay, Christopher Archibald Gordon, 4,076,985, Cl. 250-445.00T.

Empire Brushes, Inc.: *See—*
Misercola, Douglas, 4,076,032, Cl. 132-9.000.

Endriz, John Guiry, to RCA Corporation. System for modulating a flat panel image display device. 4,077,054, Cl. 358-242.000.

Enenkel, Anton: *See—*
Ebner, Heinrich; and Enenkel, Anton, 4,076,844, Cl. 426-17.000.

Energy Products of Idaho: *See—*
Sowards, Norman K., 4,075,953, Cl. 110-8.00F.

Engelhard Minerals & Chemicals Corporation: *See—*
Abramovici, Miron; and Stern, Eric W., 4,076,762, Cl. 260-676.00R.
Langley, Robert C.; and Abrash, Muriel, 4,076,894, Cl. 428-428.000.
Tiethof, Jack A., 4,076,795, Cl. 423-515.000.

English Clays Lovering Pochin & Co. Ltd.: *See—*
Jenkin, Royston Paul, 4,076,136, Cl. 214-340.000.

English, Edward: *See—*
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, 4,076,884, Cl. 428-255.000.

Enidine Incorporated: *See—*
Houghton, Benjamin T., 4,076,225, Cl. 267-34.000.

Erdmann, Jurgen: *See—*
Walter, Arthur; Fetzer, Gunter; and Erdmann, Jurgen, 4,076,979, Cl. 250-226.000.

Erickson, John W., to Boltswitch Inc. Terminal fastener and instrument tap. 4,076,368, Cl. 339-214.00R.

Erika, Inc.: *See—*
Martinez, Felix Jesus, 4,076,023, Cl. 128-214.00R.
Martinez, Felix Jesus, 4,076,285, Cl. 285-332.000.

Eriksen, Diane W. Educational puzzle. 4,076,253, Cl. 273-157.00R.

Eriksson, Kjell Viktor; and Aslund, Ivan, to AB Bofors. Gun barrel. 4,075,926, Cl. 89-16.000.

Ervin, William W.; and Fleck, Lee A., to General Motors Corporation. Universal battery case having embossed intercell partitions and process for making same. 4,076,787, Cl. 264-250.000.

Erwin Sick Gesellschaft mit beschrankter Haftung Optik-Elektronik: *See—*
Walter, Arthur; Fetzer, Gunter; and Erdmann, Jurgen, 4,076,979, Cl. 250-226.000.

Erwine, Barbara L.; and Smallcombe, Stephen H., to Varian Associates, Inc. Method and apparatus for NMR sample tube vortex plug. 4,077,002, Cl. 324-0.5AH.

Esselborn, Reiner: *See—*
Bernhard, Horst; and Esselborn, Reiner, 4,076,551, Cl. 106-291.000.

Essex Group, Inc.: *See—*
Stoneking, Richard D., 4,076,487, Cl. 431-25.000.
Taormina, Anthony J.; Wyszynski, Artur; and Witek, Roman J., 4,076,358, Cl. 339-17.00D.

Evans, Robert W., to Baker International Corporation. Fishing jar for accommodation of excess tensile load. 4,076,086, Cl. 175-297.000.

Exxon Research & Engineering Co.: *See—*
Bearden, Roby, Jr., 4,076,613, Cl. 208-108.000.

Eyman, Krystian H., to Politechnika Warszawska. Method of obtaining periodical impacts in one direction. 4,075,895, Cl. 74-61.000.

F.lli Manea S.n.c. Costruzioni Meccaniche Accessori Tessili: *See—*
Manea, Antonio, 4,076,049, Cl. 139-434.000.

Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, to Warner-Lambert Company. Composition containing alkyl 2-{[({[(5-methyl-3-isoxazolyl)-amino]-carbonyl}-methyl)amino]sulfonyl}benzoate and an alkali metal alkoxide of a lower alcohol in an inert solvent. 4,076,722, Cl. 260-307.00H.

Facha, Joseph V.: *See—*
Ash, Edward B.; Bernath, Louis; and Facha, Joseph V., 4,076,583, Cl. 176-35.000.

Fahlen, Theodore S.; and Kirk, Russell F., to GTE Sylvania Incorporated. High power gas transport laser. 4,077,018, Cl. 331-94.5PE.

Farag, Souly Atalla; and Norman, Lloyd Wendell, to U and I Incorporated. Process for decolorizing sugar solutions with peroxide. 4,076,552, Cl. 127-50.000.

Farley, David L.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,076,077, Cl. 166-315.000.

Farragher, Joseph, to Pilkington Brothers Limited. Breaking flat glass into cullet. 4,076,159, Cl. 225-3.000.

Faulstich, Marga; and Reitmayer, Franz, to Jenaer Glaswerk Schott & Gen. Optical glass. 4,076,647, Cl. 252-301.40P.

Fauve, Robert, to Institut Pasteur. Immunostimulant agent, compositions thereof and methods for their preparation. 4,076,801, Cl. 424-92.000.

Fehr, Theodor; and Hauth, Hartmut, to Sandoz Ltd. 13-Bromo lysergic acid compounds. 4,076,715, Cl. 260-285.500.

Felice, Patrick E.: *See—*
Chu, Chang K.; Bartko, John; and Felice, Patrick E., 4,076,555, Cl. 148-1.500.

Fennimore, Jack; Ruder, Gary; and Simmonite, Donald, to T. J. Smith & Nephew Limited. Treatment of particulate carbon. 4,076,892, Cl. 428-407.000.

Fenster, Larry A.; and Fenster, Leo. Sharps disposal pads. 4,076,882, Cl. 428-215.000.

Fenster, Leo: *See—*
Fenster, Larry A.; and Fenster, Leo, 4,076,882, Cl. 428-215.000.

Fenton, Donald M., to Union Oil Company of California. Ethylene-carbon monoxide copolymers. 4,076,911, Cl. 526-11.100.

Fenton, Russell S. Flash assembly for clothing-supported jewelry. 4,076,976, Cl. 362-104.000.

Ferm, Bo Christer, to AB Bahco Ventilation. Apparatus for processing dust-carrying gas and bulk goods. 4,076,509, Cl. 55-320.000.

Feroy, Arne. Bearing ring for blade of a controllable pitch propeller. 4,076,453, Cl. 416-174.000.

Ferrari, William: *See—*
Garzia, Aldo; Ferrari, William; and Bottazzi, Andrea, 4,076,815, Cl. 424-251.000.

Ferreira, Jose R. A.: *See—*
Demuth, Hans; and Ferreira, Jose R. A., 4,076,052, Cl. 139-439.000.

Ferri, Luigi. Carton for food products. 4,076,168, Cl. 229-43.000.

Ferro Corporation: *See—*
Heasley, James H., 4,076,383, Cl. 350-103.000.

Fetzer, Gunter: *See—*
Walter, Arthur; Fetzer, Gunter; and Erdmann, Jurgen, 4,076,979, Cl. 250-226.000.

Feucht, Dennis D.; and Ryan, Terry W., to Caterpillar Tractor Co. Snubbed pad resilient mount. 4,076,194, Cl. 248-9.000.

Fiat Trattori S.p.A.: *See—*
Saetti, Renato, 4,076,334, Cl. 305-54.000.

Fiberglas Canada Ltd.: *See—*
Lacon, John W., 4,076,479, Cl. 425-301.000.

Fickes, Ellwood Donald: *See—*
Edwards, Clarence Roy; and Fickes, Ellwood Donald, 4,076,999, Cl. 318-465.000.

Fiebig, Robert J. Jigging pole. 4,075,776, Cl. 43-24.000.

Field, Peter Graham Spencer; and Bennett, Ronald, to Burmah Oil Trading Limited. Production of phenols. 4,076,759, Cl. 260-621.00C.

Figge, Erwin E.: *See—*
Kim, Raymond W. H.; and Figge, Erwin E., 4,076,247, Cl. 273-105.600.

Figueras, John: *See—*
Fleckenstein, Lee J.; and Figueras, John, 4,076,529, Cl. 96-3.000.

Finberg, Arne O., to Mobil Oil Corporation. Photodegradable atactic polystyrene compositions. 4,076,655, Cl. 260-2.5HB.

Fisher, Donald J., to Xerox Corporation. Roughened imaging surface for cleaning. 4,076,564, Cl. 156-664.000.

Fisher, Roy Jack, to Nipak, Inc. Pipe cut off saw. 4,075,916, Cl. 82-78.000.

Fissler Gesellschaft mit beschrankter Haftung: *See—*
Horn, Walter; and Fissler, Rudolf, 4,075,939, Cl. 99-345.000.

Fissler, Rudolf: *See—*
Horn, Walter; and Fissler, Rudolf, 4,075,939, Cl. 99-345.000.

Fitsall, Robert Alan, to BOC International Limited. Cooling or freezing articles. 4,075,869, Cl. 62-374.000.

Fitzsimmons, William A.: *See—*
Anderson, Louis W.; and Fitzsimmons, William A., 4,077,020, Cl. 331-94.5PE.

Fleck, Lee A.: *See—*
Ervin, William W.; and Fleck, Lee A., 4,076,787, Cl. 264-250.000.

Fleckenstein, Lee J.; and Figueras, John, to Eastman Kodak Company. Photographic diffusion transfer films, processes and compositions with color moiety releasing compound. 4,076,529, Cl. 96-3.000.

Fleischer, Henry. Support frames adapted for use with car seats and beds. 4,075,720, Cl. 5-94.000.

Fleischman, Andor A., to Bell & Howell Company. Objective for optical system. 4,076,390, Cl. 350-216.000.

Floyd, Middleton Brawner, Jr., to American Cyanamid Company. Derivatives of α-(6-carboxyhexyl) furfuryl alcohol. 4,076,732, Cl. 260-347.300.

Flynn, Robert, to Ciba-Geigy Corporation. Hardenable epoxy resin compositions and process for making the same. 4,076,869, Cl. 427-386.000.

FMC Corporation: *See—*
Ames, Thomas J., 4,075,862, Cl. 61-110.000.
Austill, Robert J., 4,076,166, Cl. 228-157.000.
Roberts, Thomas E., Jr., 4,075,891, Cl. 73-483.000.

Fogelberg, Mark John, to Borg-Warner Corporation. Two-way overrunning clutch mechanism. 4,076,108, Cl. 192-35.000.

Follows, James Samuel; and Bergen, Gerhard Stanley, to Vanguard Plastics Ltd. Lock for a slidable door. 4,076,289, Cl. 292-226.000.

Fontanel, Daniel; and Rampin, Jean, to Rhone-Poulenc Textile. Granules and pellets for the modification of polycondensates which can be shaped, as well as the process for obtaining these granules and pellets and shaped articles thus obtained. 4,076,667, Cl. 260-22.00A.

Foote Mineral Company: *See—*
Smith, William Novis, 4,076,794, Cl. 423-463.000.

Forgensi, Rudolph; and Hagenbach, Robert J., to Xerox Corporation. Preparation of spheroidized particles. 4,076,640, Cl. 252-62.10R.

Forgo, Imre; Renner, Alfred; and Schmitter, Andre, to Ciba-Geigy Corporation. Process for the manufacture of polyaddition products containing imide groups. 4,076,697, Cl. 260-78.0UA.

Formex Manufacturing, Inc.: *See—*
Alesi, John, Jr., 4,075,803, Cl. 52-220.000.

Formica Corporation: *See—*
Bunkowski, Kenneth Dana, 4,076,896, Cl. 428-530.000.
Power, George Edward, 4,076,566, Cl. 156-153.000.
Power, George Edward; and Bolling, Donald Louis, 4,076,666, Cl. 260-22.0CB.

Forster, Kevin George; and Reinsma, Harold Lawrence, to Caterpillar Tractor Co. Sealed joint construction. 4,076,345, Cl. 308-120.00A.

Forster, Larry G., to Chair-E-Yacht, Inc. Self-propelled vehicle. 4,076,091, Cl. 180-26.000.

Forsythe, Richard Wells. Explosive composition with adhered air entrapping material. 4,076,562, Cl. 149-7.000.

Foseco Trading A.G.: *See—*
Duchateau, Jean Louis, 4,076,224, Cl. 266-275.000.

Foster, Gordon F.; Meissner, Helmuth E.; and Stiles, Janice L., to Corning Glass Works. Catalyst systems for the reduction of the oxides of nitrogen. 4,076,792, Cl. 423-213.500.

Foster Wheeler Energy Corporation: *See—*
Friedrich, Jan L.; and Davies, Ronald L., 4,075,978, Cl. 122-33.000.

Franck, Klaus: *See—*
Slabon, Siegfried; and Franck, Klaus, 4,076,308, Cl. 297-313.000.

Frank, Dudley B.: *See—*
Garabedian, Arthur, 4,076,003, Cl. 123-198.00F.

Franklin Electric Subsidiaries, Inc.: *See—*
Carver, Herbert K., Jr.; Chant, Albert H.; Hall, James F.; Hansen, Omar, Jr.; and Lord, John G., 4,075,815, Cl. 53-32.000.
Holt, Ronald; and Smith, Daniel J., 4,075,816, Cl. 53-74.000.

Fraser, Grover: *See—*
Moody, Harold W., Jr.; Bulkley, Clifford T.; Gagnon, Joseph A. L. N.; and Fraser, Grover, 4,076,461, Cl. 417-310.000.

Frazier, James L., to Houdaille Industries, Inc. Tool orienting and release mechanism for machine tool. 4,075,927, Cl. 90-11.00D.

Frederick, Leonard L. Hydraulic pile driving apparatus and method. 4,075,858, Cl. 61-53.500.

Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. 1,3-Bridged amino tetralins. 4,076,953, Cl. 560-142.000.

Freshcorn, Ivan Gene, to United Aircraft Products, Inc. Pre-blistering of braze joints. 4,076,164, Cl. 228-103.000.

Frey, Harry Robert: *See—*
Gross, Harvey Andrew; Frey, Harry Robert; Messner, John David; and Walters, Raymond Frederick, 4,076,426, Cl. 356-239.000.

Freyberg, Peter; Horn, Dieter; Oppenlaender, Knut; Wolf, Hans; and Distler, Dieter, to BASF Aktiengesellschaft. Continuous dyeing of polyester fibers and cellulose fibers. 4,076,497, Cl. 8-21.00C.

Freyermuth, William J., to General Motors Corporation. Variable speed friction transmission. 4,075,901, Cl. 74-226.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Sedlacek, Hugo; and Sedlacek, Gerhard, 4,075,727, Cl. 14-14.000.

Friedman, Frank: *See—*
Burton, Lawrence; and Friedman, Frank, 4,076,701, Cl. 260-112.00B.

Friedrich, Jan L.; and Davies, Ronald L., to Foster Wheeler Energy Corporation. Apparatus for heating a contaminated feedwater for steam flooding. 4,075,978, Cl. 122-33.000.

Friedrichs, Dieter. Mesh weave filter. 4,076,627, Cl. 210-499.000.

Frigitemp: *See—*
Davis, George G., 4,076,100, Cl. 181-290.000.

Frisch, Paul P., to Dayco Corporation. Valve construction. 4,076,035, Cl. 137-601.000.

Fritz, Heinz Peter; Besenhardt, Jurgen; and Rauschenbach, Gerhard, to Rheinisch-Westfalisches Elektrizitatswerk AG. High-temperature method of operating a lead-acid cell. 4,076,901, Cl. 429-50.000.

Fuji Photo Film Co., Ltd.: *See—*
Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, 4,076,861, Cl. 427-132.000.
Igarashi, Shunkichi; Okano, Takeshi; Takahama, Sho; and Hakamata, Yoshio, 4,076,412, Cl. 355-28.000.
Ikenoue, Shinpei; and Masuda, Takao, 4,076,539, Cl. 96-114.500.
Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; Sashihara, Kenji; and Masuda, Takao, 4,076,534, Cl. 96-63.000.
Oishi, Kengo; and Suzuki, Osamu, 4,076,186, Cl. 242-199.000.
Ota, Satoshi; Nakamura, Kotaro; Sakai, Nobuo; Furutachi, Nobuo; and Yokota, Yukio, 4,076,533, Cl. 96-56.500.
Takeda, Keiji; Matsumoto, Kenji; Tamura, Hiroshi; Nagata, Masayoshi; and Tsuboi, Masayoshi, 4,076,530, Cl. 96-29.00R.
Tsuboi, Masayoshi, 4,076,537, Cl. 96-88.000.
Tsuji, Nobuo; Ishige, Sadao; Miyamoto, Akio; and Kato, Hajime, 4,076,887, Cl. 428-307.000.

Yamada, Yasuyuki; Akashi, Goro; and Ogawa, Hiroshi, 4,076,890, Cl. 428-337.000.

Fujie, Seijiro; Yokoyama, Susumu, deceased; and by Yokoyama, Toshikazu, administrator, to Pioneer Electronic Corporation. Pilot signal cancelling circuit for FM multiplex demodulator. 4,076,963, Cl. 179-15.0BT.

Fujieda, Hiroshi: *See—*
Maehara, Naoyoshi; Fujieda, Hiroshi; and Saka, Tatsuo, 4,076,996, Cl. 315-106.000.

Fujikawa, Yasuo: *See—*
Iwasaki, Takeshi; Fujikawa, Yasuo; and Sasaki, Kunimasa, 4,075,890, Cl. 73-295.000.

Fujimoto, Osamu: *See—*
Ohsaki, Mikio; Kawamoto, Toshiaki; and Fujimoto, Osamu, 4,076,125, Cl. 209-80.500.

Fujishiro, Takeshi; and Kita, Toru, to Nissan Motor Company, Limited. Oxygen sensor. 4,076,608, Cl. 204-195.00S.

Fukuda, Makoto: *See—*
Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, 4,076,604, Cl. 204-98.000.

Fukushima, Yutaka: *See—*
Mukaemachi, Takuji; and Fukushima, Yutaka, 4,076,971, Cl. 179-175.30R.

Fukuyama, Yoshiya: *See—*
Nakahara, Makoto; Fukuyama, Yoshiya; Sumiyoshi, Kazuo; and Akagane, Katsuo, 4,076,765, Cl. 260-835.000.

Fulghum, Donald P., to E-Systems, Inc. Signal synthesizer spectrum contour scaler. 4,076,958, Cl. 179-1.50A.

Fulton, Alan William: *See—*
Agraz-Guerena, Jorge; and Fulton, Alan William, 4,076,556, Cl. 148-1.500.

Fulton, Robert C.; Edmunds, Donald L.; and Shields, George B., to PPG Industries, Inc. Method of operating a glass sheet tempering line. 4,076,511, Cl. 65-27.000.

Funatsu, Eiji: *See—*
Nakatsuka, Ryuzo; Suzuki, Setsuo; Tanimoto, Shinichi; and Funatsu, Eiji, 4,076,846, Cl. 426-62.000.

Furey, Richard F.: *See—*
Bybel, David; Furey, Richard F.; and Stahl, Donald P., 4,076,617, Cl. 210-19.000.

Furukawa, Hiroshi: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.

Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, to Fuji Photo Film Co., Ltd. Magnetic recording substance. 4,076,861, Cl. 427-132.000.

Furutachi, Nobuo: *See—*
Ota, Satoshi; Nakamura, Kotaro; Sakai, Nobuo; Furutachi, Nobuo; and Yokota, Yukio, 4,076,533, Cl. 96-56.500.

G. D. Searle & Co.: *See—*
Kreider, Eunice M., 4,076,717, Cl. 260-293.750.
Yonan, Peter K., 4,076,707, Cl. 260-239.00D.

Gagnon, Joseph A. L. N.: *See—*
Moody, Harold W., Jr.; Bulkley, Clifford T.; Gagnon, Joseph A. L. N.; and Fraser, Grover, 4,076,461, Cl. 417-310.000.

Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., to Gulf & Western Manufacturing Company. Bearing assembly for a ball and socket joint. 4,076,344, Cl. 308-72.000.

Galbraith, Charles L., to Ortho Pharmaceutical Corporation. Visual communications system. 4,076,398, Cl. 353-69.000.

Galiana, Antonio Bou. Ground-fault circuit interrupter. 4,077,056, Cl. 361-50.000.

Gallo, Mario, to Wirth, Gallo and Company. Mass and force meter. 4,075,887, Cl. 73-141.00R.

Gallo, Mario; and Wirth, Johannes, to Wirth, Gallo and Company. Balance with a digital and an analogue display. 4,076,088, Cl. 177-210.00R.

Galperin, Alexandr Lvovich: *See—*
Zabotin, Alexandr Alexandrovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Galperin, Alexandr Lvovich; Santucci, Nicola; and Corain, Luciano, 4,076,051, Cl. 139-436.000.

Ganci, James Barry; and Mastrangelo, Sebastian V. R., to Du Pont de Nemours, E. I., and Company. Elastic resistor compositions containing metallic-conductive particles and conductive lubricant particles. 4,076,652, Cl. 252-504.000.

Ganguly, Ashit K.; Peets, Edwin A.; and Saksena, Anil K., to Schering Corporation. Triazolo [4,5-d]-pyrimidines. 4,076,711, Cl. 260-256.40F.

Garabedian, Arthur, to Frank, Dudley B. Split engine vacuum control fuel metering system. 4,076,003, Cl. 123-198.00F.

Gardner-Denver Company: *See—*
Hisey, Robert W., 4,076,338, Cl. 308-4.00R.

Gardner, Frederick Basil, to Simon-Hartley Limited. Penstocks. 4,075,851, Cl. 61-22.00A.

Gardner, Kenneth L., to Kennedy Van Saun Corporation. Apparatus for cooling particulate material. 4,076,493, Cl. 432-77.000.

Garg, Vijay K.: *See—*
Marta, Henry A.; Mels, Kenneth D.; Garg, Vijay K.; and Miller, Albert J., 4,075,950, Cl. 105-197.00A.

Garrett Corporation, The: *See—*
Millett, Dennis A., 4,075,930, Cl. 91-361.000.
Richardson, Neil Ray, 4,075,849, Cl. 60-602.000.
Tree, Dennis Jack; and Tovey, F. Michael, 4,076,456, Cl. 416-241.00B.

Garrett, Deloris. Mobile home telephone stake. 4,076,198, Cl. 248-49.000.

Garrett, Todd: *See—*
Mar, John; Garrett, Todd; and Jacques, Petrus, 4,075,725, Cl. 9-8.00R.

Garzia, Aldo; Ferrari, William; and Bottazzi, Andrea, to Istituto Chemioterapico Italiano, S.p.A. Quinoxaline compound and composition, process for preparing compound, and method of combatting cholera therewith. 4,076,815, Cl. 424-251.000.

Gas-Fired Products, Inc.: *See—*
MacIntosh, Frank W., 4,076,059, Cl. 141-390.000.

Gates, Louis E., Jr., to Hughes Aircraft Company. Package for hermetically sealing electronic circuits. 4,076,955, Cl. 174-52.0FP.

Gatos, Harry C.: *See—*
Platakis, Nicolaos S.; and Gatos, Harry C., 4,076,866, Cl. 427-250.000.

Gaulliard, Jean-Michel: *See—*
Trinh, Stephane; Moraly, Alain; and Gaulliard, Jean-Michel, 4,076,807, Cl. 424-209.000.

Gault, Robert H., to Bethlehem Steel Corporation. Longstroke pumping apparatus for oil wells. 4,076,218, Cl. 254-178.000.

Gavrjushenko, Nikolai Sviridovich: *See—*
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Geary, Joseph E.; Pelensky, Joseph; and Hart, John Peter, to Champion Products Inc. Apparatus for applying flock to a substrate. 4,075,973, Cl. 118-7.000.

Gee, Edwin, to Technitron, Inc. Current control device and method. 4,076,974, Cl. 219-108.000.

Geisthoff, Hubert, to Jean Walterscheid GmbH. Telescoping torque transmitting shaft. 4,075,872, Cl. 64-23.700.

Geisthoff, Hubert, to Jean Walterscheid GmbH. Free-wheeling overload coupling. 4,075,873, Cl. 64-29.000.

Geller, Rodger E.; Smith, Stanley E.; and Wilson, Wayne A., to General Motors Corporation. Method of forming an embossed and coated design on the surface of a formable plastic sheet. 4,076,789, Cl. 264-259.000.

General Cable Corporation: *See—*
Thompson, Walter F.; and Redo, Dennis M., 4,076,132, Cl. 214-16.40A.

General Dynamics Corporation: *See—*
Little, Clayton D.; and Machmeier, Paul M., 4,076,525, Cl. 75-128.00B.

General Electric Company: *See—*
Byrnes, Joseph Edward, 4,076,441, Cl. 407-64.000.
Calkins, Thornton Ross, 4,076,686, Cl. 260-45.80A.
Chang, Mike F.; Anthony, Thomas R.; and Cline, Harvey E., 4,076,559, Cl. 148-1.500.
Datta, Ranajit K., 4,076,991, Cl. 313-220.000.
Dochterman, Richard W., 4,076,197, Cl. 248-15.000.
Edwards, Clarence Roy; and Fickes, Ellwood Donald, 4,076,999, Cl. 318-465.000.
Glover, Gary H., 4,075,883, Cl. 73-620.000.
Jenne, Frank, Jr.; and Tarnay, Denes, 4,076,143, Cl. 220-2.10R.
McVey, Charles I., 4,076,898, Cl. 428-553.000.
Sargisson, Donald Farley, 4,075,833, Cl. 60-262.000.
Schrader, Paul D., 4,075,864, Cl. 62-180.000.
Schroeter, Siegfried H.; Bolon, Donald A.; and Lucas, Gary M., 4,076,489, Cl. 431-94.000.
Zavitsanos, Peter D.; West, Martin M.; and Browne, William G., 4,076,563, Cl. 149-37.000.

General Filter Company: *See—*
Scholten, John James; and Young, James Clinton, 4,076,625, Cl. 210-274.000.

General Foods Corporation: *See—*
Ryder, William S.; and Mezzino, Joseph F., 4,076,855, Cl. 426-594.000.
Zeitlin, Benjamin R.; Pritchard, Alan B.; and Levenson, Harold S., 4,076,856, Cl. 426-594.000.

General Mills, Inc.: *See—*
Davis, Noel; Haub, John T.; and Rustad, Stanley C., 4,075,949, Cl. 104-162.000.

General Motors Corporation: *See—*
Burke, Harold J., 4,075,871, Cl. 64-17.00R.
Cavell, Raymond J., 4,075,821, Cl. 53-376.000.
Chatterley, James P., 4,076,264, Cl. 280-81.00A.
Ditto, Edwin D.; and Abu Akeel, A. Hadi Kobaisi, 4,076,296, Cl. 293-71.00R.
Ditto, Edwin D., 4,076,780, Cl. 264-40.500.
Ditto, Edwin D., 4,076,788, Cl. 264-255.000.
Ervin, William W.; and Fleck, Lee A., 4,076,787, Cl. 264-250.000.
Freyermuth, William J., 4,075,901, Cl. 74-226.000.
Geller, Rodger E.; Smith, Stanley E.; and Wilson, Wayne A., 4,076,789, Cl. 264-259.000.
Gergoe, Bela, 4,076,301, Cl. 296-50.000.
Gilbert, William F.; Schertz, Burtron D.; and Wilkinson, Lester, 4,076,959, Cl. 179-1.00D.
Lee, Robert W.; and Croat, John J., 4,076,561, Cl. 148-103.000.
Marta, Henry A.; Mels, Kenneth D.; Garg, Vijay K.; and Miller, Albert J., 4,075,950, Cl. 105-197.00A.

Moody, Warren L.; and Baugh, Edward D., 4,076,094, Cl. 180-108.000.
Schaefer, Robert H., 4,075,912, Cl. 74-867.000.
Short, William T., 4,076,774, Cl. 264-4.000.
Taylor, David W.; and Peterson, Philip R., 4,076,332, Cl. 303-97.000.
Watson, Richard D., 4,076,989, Cl. 310-89.000.
Williamitis, Victor A., 4,075,866, Cl. 62-274.000.
Winchell, Frank J., 4,076,270, Cl. 280-220.000.

General Scanning, Inc.: *See—*
Montagu, Jean I., 4,076,998, Cl. 318-132.000.

General Signal Corporation: *See—*
Banker, William W.; and Lumbis, Anthony W., 4,076,322, Cl. 303-1.000.
Carlson, William L., Jr., 4,075,898, Cl. 74-89.150.
Michel, Basil J.; Morse, Gary P.; and Wilcox, Alfred L., 4,075,766, Cl. 34-57.00D.

General Tire & Rubber Company, The: *See—*
Elmer, Otto C., 4,076,945, Cl. 560-25.000.

Genini, Graziano, to Albatex A.G. Means guiding the straps of the weft carrying grippers inside the shed. 4,076,053, Cl. 139-449.000.

Gentles, Margaret A.: *See—*
Green, Michael J.; Shue, Ho-Jane; Shapiro, Elliot L.; and Gentles, Margaret A., 4,076,708, Cl. 260-239.570.

Genzer, Jerome D.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,076,722, Cl. 260-307.00H.

Georgiev, Georgi Taney: *See—*
Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, 4,076,521, Cl. 75-24.000.

Gergoe, Bela, to General Motors Corporation. Vehicle tailgate. 4,076,301, Cl. 296-50.000.

Germain, Robert A., to True Temper Corporation. Battery operated shears. 4,075,760, Cl. 30-220.000.

Gerstner-Stevens, Ditmar: *See—*
Mista, Kresimir; and Gerstner-Stevens, Ditmar, 4,075,744, Cl. 28-224.000.

Geschwender, Robert C., to Lancaster Research and Development Corporation. Mastic composition and composite structural panels formed therefrom. 4,076,880, Cl. 428-116.000.

Gettleman, Ronald L.; and Stoner, Peter D., to Gettleman-Stoner, Inc. Mobile beverage dispensing cart. 4,076,349, Cl. 312-236.000.

Gettleman-Stoner, Inc.: *See—*
Gettleman, Ronald L.; and Stoner, Peter D., 4,076,349, Cl. 312-236.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
Elsner, Burckhardt; Lagodka, Gunter; Plevak, Lubomir; and Rosenberg, Harry, 4,075,857, Cl. 61-45.00D.
Hauschopp, Alois; and Breuer, Oswald, 4,076,318, Cl. 299-91.000.

Giacino, Christopher: *See—*
Van Delft, Andries; and Giacino, Christopher, 4,076,852, Cl. 426-533.000.

Gibson Chemicals International Pty. Limited: *See—*
Lausberg, Johannes Willebrordes; and Downton, Denys Edward, 4,076,146, Cl. 222-52.000.

Gibson, Harry W.; Bailey, Frank C.; and Mincer, Joseph L., to Xerox Corporation. Tribo modified carrier materials via acylation. 4,076,893, Cl. 428-407.000.

Gidlof, Karl Gunnar: *See—*
Almer, Bengt Onnert; and Gidlof, Karl Gunnar, 4,076,205, Cl. 248-524.000.

Gieske, Edward T., Jr. Apparatus for baling compressible material. 4,075,817, Cl. 53-124.00A.

Giglia, Robert Domenico, to American Cyanamid Company. Segmented electrochromic display general. 4,076,386, Cl. 350-357.000.

Gilbert, William F.; Schertz, Burtron D.; and Wilkinson, Lester, to General Motors Corporation. Volume, tone and balance control for multi-channel audio systems. 4,076,959, Cl. 179-1.00D.

Gill, Michael L., to Goodyear Tire & Rubber Company, The. Elastic wheel well filler. 4,076,067, Cl. 152-381.600.

Gilmour, Richard C. Multipurpose display rack. 4,076,126, Cl. 211-59.100.

Gilson, Verle A.; Schriever, Richard L.; and Shearer, James W., to United States of America, Energy. Ultraviolet radiation induced discharge laser. 4,077,017, Cl. 331-94.5PE.

Giovanelli, Anton Alfred Arthur; and Schmidt, Eckhard Wolfgang, to Imperial Chemical Industries Limited. Tack spun pile surfaced products. 4,076,874, Cl. 428-35.000.

Girard, Leon E.: *See—*
Handy, Richard L.; Girard, Leon E.; Roorda, Bruce R.; and Pitt, John M., 4,075,885, Cl. 73-88.00E.

Girling Limited: *See—*
Taft, Philip Augustus, 4,076,036, Cl. 137-118.000.

GKN Sankey Limited: *See—*
Hart, Frederick Leslie, 4,076,268, Cl. 280-179.00R.

Glacier Metal Company Limited, The: *See—*
Thorpe, Ernest John, 4,076,342, Cl. 308-36.000.

Gladstone, Shaul; and Neumoyer, Clifton R., to Argus Chemical Corporation. Cellulose thiocyanate and process for preparing the same. 4,076,918, Cl. 536-59.000.

Glaise, Rene: *See—*
Croisier, Alain; and Glaise, Rene, 4,076,986, Cl. 307-221.00D.

Glaser, Harold, to James David Incorporated. Corner construction. 4,076,432, Cl. 403-176.000.

Glaser, Herbert: *See—*
Vogel, Eberhard; Glaser, Herbert; Kleider, Albert; and Dietz, Klaus, 4,075,793, Cl. 51-170.0TL.

Glaxo Laboratories Limited: *See—*
Laundon, Brian, 4,076,936, Cl. 544-21.000.
Walker, Derek; and Chapman, Philip Howard, 4,076,913, Cl. 526-19.000.

Gleckler, George C.: *See—*
Casey, Donald J.; and Gleckler, George C., 4,076,798, Cl. 424-22.000.

Global Marine, Inc.: *See—*
Sjogren, Charles Norman, 4,075,964, Cl. 114-40.000.

Glover, Gary H., to General Electric Company. Ultrasonic fan beam scanner for computerized time-of-flight tomography. 4,075,883, Cl. 73-620.000.

Go, Santos W., to Owens-Illinois, Inc. Terephthalic acid/p,p-sulfonyldibenzoic acid/ethylene glycol/neopentyl glycol polyester compositions and containers made therefrom. 4,076,693, Cl. 260-75.00S.

Godfrey, Darryl A., to Eastman Kodak Company. Hot-melt adhesives having improved properties at elevated temperatures. 4,076,670, Cl. 260-27.00R.

Goff, Mark D., to GRS Instruments, Inc. Self-contained miniature timer. 4,075,829, Cl. 58-152.00T.

Golden, Martin P.; and Govi, Aldo R., to United States of America, Energy. Rodded shutdown system for a nuclear reactor. 4,076,584, Cl. 176-36.00R.

Golston, Stefan, to Kamyr, Inc. Continuous oscillation of liquid separator. 4,076,623, Cl. 210-77.000.

Goodfellow, Anthony Gerald, to Dunlop Limited. Manufacture of moulded articles. 4,076,565, Cl. 156-125.000.

Goodyear Aerospace Corporation: *See—*
Bermingham, Peter D.; and Chin, Robert W., 4,076,106, Cl. 188-250.00G.

Goodyear Tire & Rubber Company, The: *See—*
Gill, Michael L., 4,076,067, Cl. 152-381.600.
Watts, William A., 4,076,769, Cl. 260-893.000.

Goos, Heinz: *See—*
Rosenkranz, Otto; Goos, Heinz; and Seifert, Karl-Heinrich, 4,076,071, Cl. 165-2.000.

Gordy, Robert S.: *See—*
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., 4,077,016, Cl. 331-4.000.

Goshi Kaisha Mizuno Kogeisha: *See—*
Mizuno, Akira, 4,076,093, Cl. 180-82.00R.

Goto, Kenji; and Tate, Takao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine having an auxiliary combustion chamber without an intake valve. 4,076,000, Cl. 123-191.00S.

Gottermeier, William F., to Eastman Kodak Company. Thermosensitive image-forming element and method of processing thereof. 4,076,532, Cl. 96-48.0HD.

Gould Inc.: *See—*
Subramanyan, Palliyil K.; Makowski, Mieczyslaw Paul; and Setele, Robert Joseph, 4,076,597, Cl. 204-13.000.

Goulet, Guy; and Goulet, John. Marble game with retractable playing surface. 4,076,248, Cl. 273-123.00R.

Goulet, John: *See—*
Goulet, Guy; and Goulet, John, 4,076,248, Cl. 273-123.00R.

Govi, Aldo R.: *See—*
Golden, Martin P.; and Govi, Aldo R., 4,076,584, Cl. 176-36.00R.

Granath, Alf: *See—*
Granath, Einar; and Granath, Alf, 4,076,447, Cl. 415-2.000.

Granath, Einar; and Granath, Alf. Water-power motor. 4,076,447, Cl. 415-2.000.

Grande, Edvard. Coupler device. 4,076,163, Cl. 228-56.000.

Grandview Industries Limited: *See—*
Hacke, Gerhard A., 4,076,477, Cl. 425-192.00R.

Granges Essem Aktiebolag: *See—*
Thyberger, Filip Bertil; and Lindstrom, Kurt Olle Ragnvald, 4,075,861, Cl. 61-105.000.

Graubin, Yanis Ekabovich: *See—*
Ioffe, Benyamin Alexandrovich; Kalnin, Robert Karlovich; Zommer, Jury Arvidovich; Graubin, Yanis Ekabovich; Davydenko, Eduard Prokofievich; and Kern, Ivan Ivanovich, 4,077,027, Cl. 335-219.000.

Gray, Thomas J., to Olin Corporation. Electrode with lanthanum-containing perovskite surface. 4,076,611, Cl. 204-290.00F.

Green, Harold A.: *See—*
Kaplan, Saul; Merianos, John J.; Green, Harold A.; and Petrocci, Alfonso N., 4,076,744, Cl. 260-501.190.

Green, Michael J.; Shue, Ho-Jane; Shapiro, Elliot L.; and Gentles, Margaret A., to Schering Corporation. Process for the preparation of 7α-halogeno-3-oxo-4-dehydro steroids and novel 7α-halogeno derivatives produced thereby. 4,076,708, Cl. 260-239.570.

Greeninger, Carroll D. Fireplace wood cutting machine. 4,076,061, Cl. 144-3.00K.

Greenview Manufacturing Company: *See—*
Siemund, Herbert A., 4,075,730, Cl. 15-245.000.

Greeson, Richard L.; and Philofsky, Elliott M., to Motorola, Inc. Metallization system for semiconductive devices, devices utilizing such metallization system and method for making devices and metallization system. 4,077,045, Cl. 357-71.000.

Greis, Ulrich: *See—*
Deml, Reinhold; Greis, Ulrich; Hofmann, Wilfried; and Rauffer, Walter, 4,076,384, Cl. 350-122.000.

Gresen Manufacturing Company: *See*—
Stephens, William T., 4,075,933, Cl. 91-506.000.
Gribkova, Pelageya Nikolaevna: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.
Gribova, Irina Alexandrovna: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Paviova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.
Griffin, Edward R. Auxiliary water system for outboard motor. 4,075,969, Cl. 115-17.000.
Griffin, James F.: *See*—
Morez, Gene S.; and Griffin, James F., 4,077,013, Cl. 330-267.000.
Grilli, Victor John: *See*—
Chulay, Steven John; and Grilli, Victor John, 4,076,170, Cl. 233-26.000.
Grimaud, Edouard; and Koeppel, Robert, to Produits Chimiques Ugine Kuhlmann. Alkali salts of a sulphonated styrene polymer or copolymer as fluidizing agents and a process for preparing the same. 4,076,699, Cl. 260-79.50C.
Groger, Rolf, to August Thyssen-Hutte AG. Use of an acid-resisting cement for the protection against corrosion of steel surfaces exposed to hot gases. 4,076,221, Cl. 266-44.000.
Grognet, Jean-Claude: *See*—
Papantoniou, Christos; and Grognet, Jean-Claude, 4,076,912, Cl. 526-16.000.
Gromov, Jury Vasilievich; Leonov, Boris Ivanovich; Smirnov, Oleg Petrovich; Smirnov, Nikolai Nikolaevich; Nagornaya, Ljudmila Lavrentievna; and Zakharin, Yakov Abramovich. Introscope. 4,076,984, Cl. 250-367.000.
Gropper, Hans: *See*—
Urban, Friedrich; Buechner, Oskar; Hartig, Ulrich; and Gropper, Hans, 4,076,919, Cl. 526-64.000.
Gross, Harvey Andrew; Frey, Harry Robert; Messner, John David; and Walters, Raymond Frederick, to RCA Corporation. Method for inspecting cathode-ray-tube window for objectionable cord. 4,076,426, Cl. 356-239.000.
Gross, James R., to Dow Chemical Company, The. Substantially dry water swellable particulate polyelectrolyte. 4,076,928, Cl. 526-240.000.
Gross, Marvin H.; and Kolb, Alfred, to Transparent Glass Coatings Co., Inc. Burglar-proof window and like panes of glass. 4,075,802, Cl. 52-203.000.
Gross, William Joseph: *See*—
Landsinger, Edmund Emil; Chang, Richard Shih-Teng; and Gross, William Joseph, 4,075,771, Cl. 35-31.00R.
Grossman, Harold, to Montclair Research Corporation. Filter and cigarette including a filter. 4,076,031, Cl. 131-261.00A.
GRS Instruments, Inc.: *See*—
Goff, Mark D., 4,075,829, Cl. 58-152.00T.
Grubbs, Jerry A. Directional antenna azimuth control system. 4,077,000, Cl. 318-604.000.
Grumman Aerospace Corporation: *See*—
Chen, Schoen-nan, 4,076,904, Cl. 429-111.000.
GTE Sylvania Incorporated: *See*—
Fahlen, Theodore S.; and Kirk, Russell F., 4,077,018, Cl. 331-94.5PE.
Hall, Harold H., Jr., 4,076,488, Cl. 431-93.000.
Gueldner, Howard C. Mechanical decoupler. 4,076,435, Cl. 403-322.000.
Guild, Charles L. Composite pile and tapered concrete tip therefor. 4,075,859, Cl. 61-53.000.
Gulbenk, Alin H., to Dow Chemical Company, The. Substituted pyridinyl methoxy (or 1-methyl methoxy)benzeneamines. 4,076,719, Cl. 260-296.00R.
Gulf Oil Corporation: *See*—
Boehme, Robert Emerson; and Murphy, Clarence Rhodes, 4,076,681, Cl. 260-33.6PQ.
Gulf & Western Manufacturing Company: *See*—
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,076,344, Cl. 308-72.000.
Gulton Industries, Inc.: *See*—
Campbell, Robert F., 4,076,361, Cl. 339-75.00M.
Gundlach, Robert W.: *See*—
Bean, Lloyd F.; and Gundlach, Robert W., 4,076,528, Cl. 96-105.00R.
Gundlach, Theodore F.; and Hawthorne, Arthur L., to Rexnord, Inc. Dust abatement device and method of dust abatement. 4,076,315, Cl. 299-64.000.
Gusching, Nagle V.; and Kuck, Kermit T., to Monarch Machine Tool Company, The. Plural slide machine. 4,075,753, Cl. 29-568.000.
Gutman, David. Pedestrian contact guard. 4,076,295, Cl. 293-71.00R.
Gvinepadze, Alexei Davidovich: *See*—
Vitaliev, Georgy Viktorovich; Gvinepadze, Alexei Davidovich; Smirnov, Rem Vasilievich; and Sofiisky, Gury Dmitrievich, 4,077,029, Cl. 365-49.000.
H & G Industries, Inc.: *See*—
Mazzolla, Richard, 4,076,437, Cl. 403-350.000.
Haas, Georges; and Rossi, Alberto, to Ciba-Geigy Corporation. Certain pyridyl methanones and pharmaceutical compositions containing same. 4,076,822, Cl. 424-263.000.
Haas, Werner E. L.; and Dir, Gary A., to Xerox Corporation. Magnetic display. 4,076,387, Cl. 350-362.000.
Haas, Werner E. L.: *See*—
Keezer, Richard C.; and Haas, Werner E. L., 4,076,858, Cl. 427-19.000.
Haberle, Friedrich: *See*—
Kress, Dieter; and Haberle, Friedrich, 4,076,445, Cl. 408-226.000.
Hacke, Gerhard A., to Grandview Industries Limited. Multiple extrusion apparatus. 4,076,477, Cl. 425-192.00R.
Hackstein, Karl-Gerhard; Hrovat, Milan; and Wolff, Willi, to Nuken G.m.b.H. Block fuel elements for high temperature power reactors. 4,076,775, Cl. 264-0.500.
Haddad, Daniel G. Hockey stick. 4,076,240, Cl. 273-67.00A.
Hagenbach, Robert J.: *See*—
Forgensi, Rudolph; and Hagenbach, Robert J., 4,076,640, Cl. 252-62.10R.
Hager, C. Bradley: *See*—
Dugle, James B.; and Hager, C. Bradley, 4,076,502, Cl. 23-230.00R.
Haggerty, William Andrew: *See*—
Cox, Joseph Henry, Jr.; and Haggerty, William Andrew, 4,076,442, Cl. 408-8.000.
Hague, David P.; Malkani, Dalip T.; Middlemiss, Andrew; and Scholey, Stuart, to British Steel Corporation. Manufacture of metal strip. 4,075,747, Cl. 29-18.000.
Haigh, Harold Edward; and Hofmann, Dietrich Adolf, to Tioxide Group Limited. Supported vessel and means for support thereof. 4,076,200, Cl. 248-146.000.
Haight, Nicholas; and Madsen, Trygve T., to Eastern Cyclone Industries, Inc. Electronic control system for operating a pneumatic trash linen conveying network. 4,076,321, Cl. 302-27.000.
Hakamata, Yoshio: *See*—
Igarashi, Shunkichi; Okano, Takeshi; Takahama, Sho; and Hakamata, Yoshio, 4,076,412, Cl. 355-28.000.
Hale, Peter: *See*—
Marsh, Robert Anthony; Mackie, Gordon John; and Hale, Peter, 4,076,800, Cl. 424-70.000.
Hall, Charles O., to Plummer, Sherman R.; and Porter, Randall, part interest to each. Tennis teaching aid. 4,076,239, Cl. 273-29.00A.
Hall, Harold H., Jr., to GTE Sylvania Incorporated. Selective firing mechanism for array of percussive flashlamps. 4,076,488, Cl. 431-93.000.
Hall, James F.: *See*—
Carver, Herbert K., Jr.; Chant, Albert H.; Hall, James F.; Hansen, Omar, Jr.; and Lord, John G., 4,075,815, Cl. 53-32.000.
Hall, John B.: *See*—
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.
Hall, Stanley Darwin, to W. R. Grace & Co. Package of bags. 4,076,122, Cl. 206-460.000.
Haller, George S.; and Uphoff, Theodore C. Apparatus for lifting a manhole cover. 4,076,217, Cl. 254-131.000.
Halliburton Company: *See*—
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,076,077, Cl. 166-315.000.
Halm Instrument Co., Inc.: *See*—
Harrison, Henry, 4,076,076, Cl. 165-171.000.
Halopoff, William. Attachment for garage door spring. 4,076,433, Cl. 403-213.000.
Halpern, William. Cutting tool assembly. 4,076,443, Cl. 408-191.000.
Hamaguchi, Hiroshi; and Miyata, Shin, to Minolta Camera Kabushiki Kaisha. Belt type sensitive member unit. 4,076,409, Cl. 355-16.000.
Hamano, Tadashi, to Kabushiki Kaisha Daini Seikosha. Coloring method for synthetic resin. 4,076,496, Cl. 8-4.000.
Hamasaki, Toshio: *See*—
Tsuda, Yoshinao; Arita, Masafumi; Hamasaki, Toshio; Tsumagari, Tatsumi; and Kenjo, Takenori, 4,076,821, Cl. 424-263.000.
Hamilton, Willard C.: *See*—
Scouten, Charles G.; and Hamilton, Willard C., 4,076,641, Cl. 252-62.10P.
Hamma, Karlmann; and Holdenried, Willy, to Zahnradfabrik Friedrichshafen AG. Control system for hydrostatic transmission. 4,075,841, Cl. 60-444.000.
Hammann, Ingeborg: *See*—
Lorenz, Walter; and Hammann, Ingeborg, 4,076,808, Cl. 424-211.000.
Lorenz, Walter, deceased; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,076,806, Cl. 424-200.000.
Hammer, Jacob Meyer, to United States of America, Navy. On line electro-optic modulator. 4,076,381, Cl. 350-96.140.
Hammer, Richard Benjamin; Turbak, Albin Frank; Portnoy, Norman A.; and West, Arthur C., to International Telephone and Telegraph Corporation. Process for producing regenerated cellulosic articles. 4,076,932, Cl. 536-30.000.

Hammer, Richard Benjamin: *See—*
Turbak, Albin Frank; Hammer, Richard Benjamin; Portnoy, Norman A.; and West, Arthur C., 4,076,933, Cl. 536-30.000.

Hanaoka, Masanori, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas purifying system for an internal combustion engine. 4,075,837, Cl. 60-282.000.

Hancor, Inc.: *See—*
Alpers, Robert J.; Crates, Fredrick J.; Ott, Denis P.; and Schmunk, John D., 4,076,040, Cl. 137-371.000.

Handy, Richard L.; Girard, Leon E.; Roorda, Bruce R.; and Pitt, John M., to Iowa State University Research Foundation, Inc. Rock borehole shear tester. 4,075,885, Cl. 73-88.00E.

Hannebaum, Harold W., to Raymond Lee Organization, Inc., The, a part interest. Fireplace. 4,076,009, Cl. 126-120.000.

Hansen, John H., to Delong Corporation. Mobile ship loading and unloading facility. 4,075,860, Cl. 61-87.000.

Hansen, Omar, Jr.: *See—*
Carver, Herbert K., Jr.; Chant, Albert H.; Hall, James F.; Hansen, Omar, Jr.; and Lord, John G., 4,075,815, Cl. 53-32.000.

Hanzelka, Lubomir; Vidlar, Josef; and Neuman, Ladislav, to Tatra, narodni podnik. Vehicle side wall and method of making same. 4,076,298, Cl. 296-28.00R.

Hara, Kunihiko: *See—*
Yamawaki, Masao; Aoki, Katsuo; Ina, Osamu; Suzuki, Takao; Oka, Yoshio; and Hara, Kunihiko, 4,075,972, Cl. 118-6.000.

Harada, Masato: *See—*
Satoh, Akihiro; Takahashi, Akio; Masuda, Jun; Harada, Masato; and Yamada, Sadahiko, 4,076,922, Cl. 526-97.000.

Harada, Tetsuya; and Yumoto, Tunemasa, to Japan Synthetic Rubber Co., Ltd. Process for recovering high purity fatty acids and/or rosin acid and sterols. 4,076,700, Cl. 260-97.600.

Haralampiev, Georgi Alexandrov: *See—*
Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, 4,076,521, Cl. 75-24.000.

Harbison, William H.; Mohnach, Michael G.; and Plisky, John J., to Anderson Company, The. Windshield wiper refill unit. 4,075,731, Cl. 15-250.420.

Hardison, Leslie C., to Air Resources, Inc. Chelate oxidation of hydrogen sulfide in sour water. 4,076,621, Cl. 210-60.000.

Hardouin, Jean Claude Henri Raoul; and Vallette, Maurice Rene Jean, to Produits Chimiques Ugine Kuhlmann. Indanthrene dyes. 4,076,713, Cl. 260-263.000.

Hargraves, William J. Nozzle flush system. 4,075,718, Cl. 4-300.000.

Hargreaves, James Roger: *See—*
Harris, Arthur; Burrows, John; and Hargreaves, James Roger, 4,076,501, Cl. 21-2.70A.

Harper, Bobby R., to Phillips Petroleum Company. Amorphous polypropylene in hydrogenated rubbery block copolymers. 4,076,669, Cl. 260-23.70R.

Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., to Minnesota Mining and Manufacturing Company. N-substituted perfluoroalkanesulfonamides as herbicides. 4,076,519, Cl. 71-103.000.

Harris, Arthur; Burrows, John; and Hargreaves, James Roger, to Ciba-Geigy Corporation. Corrosion inhibition of water systems with phosphonic acids. 4,076,501, Cl. 21-2.70A.

Harris Corporation: *See—*
Cook, Koy B., Jr., 4,075,754, Cl. 29-571.000.

Harris, William Donald, to Burlington Industries, Inc. Injury protection device for machinery. 4,075,961, Cl. 112-277.000.

Harrison, George W. Expansion joint and seal for sewer pipe. 4,076,283, Cl. 285-230.000.

Harrison, Henry, to Halm Instrument Co., Inc. Mechanical heat exchange joint. 4,076,076, Cl. 165-171.000.

Hart, Frederick Leslie, to GKN Sankey Limited. Securing means. 4,076,268, Cl. 280-179.00R.

Hart, John Peter: *See—*
Geary, Joseph E.; Pelensky, Joseph; and Hart, John Peter, 4,075,973, Cl. 118-7.000.

Hart, Maurice Wright, Jr.; and Hart, William Carlo. Process for color and surface stabilization in forming water-extendable polyester resin plastics and the like. 4,076,784, Cl. 264-102.000.

Hart, William Carlo: *See—*
Hart, Maurice Wright, Jr.; and Hart, William Carlo, 4,076,784, Cl. 264-102.000.

Hartig, Ulrich: *See—*
Urban, Friedrich; Buechner, Oskar; Hartig, Ulrich; and Gropper, Hans, 4,076,919, Cl. 526-64.000.

Hartmann, Max, to Brown, Boveri-Sulzer Turbomaschinen AG. Gas turbine plant. 4,076,452, Cl. 415-219.00R.

Hartsock, Robert E. Signal transmission and control system. 4,076,039. Cl. 137-344.000.

Hartwimmer, Robert, to Hoechst Aktiengesellschaft. Process for the preparation of fluorocarbon waxes. 4,076,760, Cl. 260-653.10R.

Haskell, Donald M., to Phillips Petroleum Company. Extractive distillation of C_4 hydrocarbons with an extractant mixture. 4,076,595, Cl. 203-51.000.

Haswell, John N. Postpartum fluid loss receptacle. 4,076,017, Cl. 128-2.00F.

Hatanaka, Takashi: *See—*
Nakashima, Katsutoshi; Kita, Toshio; Osawa, Ryuzo; and Hatanaka, Takashi, 4,076,220, Cl. 366-69.000.

Hattendorf, Henry John. Two-speed video recorder. 4,075,900, Cl. 74-217.00S.

Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, to Nippon Soken, Inc. Additional air control device. 4,075,835, Cl. 60-276.000.

Haub, John T.: *See—*
Davis, Noel; Haub, John T.; and Rustad, Stanley C., 4,075,949, Cl. 104-162.000.

Hauberg, Georg Hans Henrik, to Aktieselskabet Niro Atomizer. Centrifugal separator for separating liquid and gas. 4,076,507, Cl. 55-1.000.

Hauck, Frederic Peter; Cimarusti, Christopher M.; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. 5,6,7,8-Tetrahydronaphthalene hypotensive agents. 4,076,843, Cl. 424-330.000.

Haude, Friedhelm, to KHD Industrienlagen AG. Device for controlling flow from the discharge end of a tubular ball mill or the like. 4,076,178, Cl. 241-33.000.

Haug, Heinz: *See—*
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Haugwitz, Rudiger D.; and Cruthers, Larry R., to E. R. Squibb & Sons, Inc. Method of treating helminthiasis by parenteral or topical administration of sulfoxide derivatives of benzimidazoles. 4,076,825, Cl. 424-273.00R.

Haugwitz, Rudiger D.; and Cruthers, Larry R., to E. R. Squibb & Sons, Inc. Method of treating helminthiasis by parenteral administration of sulfoxide derivatives of benzimidazoles. 4,076,827, Cl. 424-273.00R.

Haugwitz, Rudiger D.; and Cruthers, Larry R., to E. R. Squibb & Sons, Inc. Method of treating helminthiasis by parenteral administration of sulfoxide derivatives of benzimidazoles. 4,076,828, Cl. 424-273.00R.

Hauschopp, Alois; and Breuer, Oswald, to Gewerkschaft Eisenhutte Westfalia. Cutter bit assemblies for coal ploughs. 4,076,318, Cl. 299-91.000.

Hauth, Hartmut: *See—*
Fehr, Theodor; and Hauth, Hartmut, 4,076,715, Cl. 260-285.500.

Hawthorne, Arthur L.: *See—*
Gundlach, Theodore F.; and Hawthorne, Arthur L., 4,076,315, Cl. 299-64.000.

Hayashi, Fujio; and Corbin, Robert W., to Xerox Corporation. Interlocking apparatus for an optical system and reproducing machine. 4,076,417, Cl. 355-60.000.

Hayashi, Yutaka, to Agency of Industrial Science & Technology. Nonvolatile memory semiconductor device. 4,077,044, Cl. 357-23.000.

Hazelet, Glenn John: *See—*
Batha, Howard Dean; and Hazelet, Glenn John, 4,076,692, Cl. 260-59.00R.

Heasley, James H., to Ferro Corporation. Multi-sided retroreflector. 4,076,383, Cl. 350-103.000.

Hechtl, Wolfgang: *See—*
Wohlfarth, Ernst; Hechtl, Wolfgang; Matejcek, Klaus; and Kleinschwarzer, Adolf, 4,076,684, Cl. 260-37.0SB.

Heckele, Helmut, to Richard Wolf GmbH. Endoscopes. 4,076,018, Cl. 128-6.000.

Heckley, Warner M.; and Richards, Gerald F., to Avco Corporation. Crop conditioner roll structure. 4,075,822, Cl. 56-1.000.

Heden, Carl-Goran. Method in microbiological analysis. 4,076,591, Cl. 195-103.50K.

Hedstrom, Robert E.; and Brown, Edmund W., to UPEC Corporation. Vehicle-top-carrier support means. 4,076,157, Cl. 224-42.10E.

Heet, Gregory S. String instrument vibration initiator and sustainer. 4,075,921, Cl. 84-1.160.

Heidan, Klaus. Apparatus for treating webs of textile goods with hot air or steam. 4,075,875, Cl. 68-5.00D.

Heidenreich & Harbeck Zweigniederlassung der Gildemeister AG: *See—*
Rosenkranz, Otto; Goos, Heinz; and Seifert, Karl-Heinrich, 4,076,071, Cl. 165-2.000.

Heim Universal Inc.: *See—*
McCloskey, Albert R., 4,076,343, Cl. 308-72.000.

Heimbach, Paul: *See—*
Wilke, Gunther; and Heimbach, Paul, 4,076,757, Cl. 260-611.00R.

Heimberger, Helmut, to Optilon W. Erich Heilmann GmbH. Slide-fastener stringer half with knitted-in coupling elements and method of making same. 4,075,874, Cl. 66-192.000.

Heinemann Electric Company: *See—*
Lisnay, Albert D., 4,077,024, Cl. 335-8.000.

Heinemann, Karl-Heinz: *See—*
Cherubim, Martin; Heinemann, Karl-Heinz; and Josten, Friedrich, 4,076,683, Cl. 260-37.00N.

Heinrich Frings, Firma: *See—*
Ebner, Heinrich; and Enenkel, Anton, 4,076,844, Cl. 426-17.000.

Helava, Uuno Vilho, to Bendix Corporation, The. Sensor data input by means of analog to pulse width-to digital converter. 4,077,030, Cl. 340-183.000.

Heller, Robert I.; Schafer, Larry C.; and McCracken, Stephen R., to Westinghouse Electric Corporation. Digital radar control system and method. 4,077,038, Cl. 343-7.00A.

Hendricks, Bobby G.: *See—*
Kiser, Gary L.; and Hendricks, Bobby G., 4,076,754, Cl. 260-603.00C.

Hendriks, Ferdinand, to International Business Machines Corporation. Guard jets in multiple nozzle printing. 4,077,040, Cl. 346-75.000.

Hendry, George O.; Hilton, John L.; and Kim, Jinchoon, to University of Pennsylvania, The Trustees of the. Tube target for fusion neutron generator. 4,076,990, Cl. 313-61.00S.

Hengen, Edward John, to Deere & Company. Harvesting machine feed mechanism. 4,075,824, Cl. 56-14.600.

Henkel KGaA: *See*—
Koch, Karlheinz; and Rutzen, Horst, 4,076,743, Cl. 260-501.130.
Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See*—
Kassner, Karl-Heinz, 4,076,661, Cl. 260-17.00R.
Henrion, Michel Andre Robert; and Coudray, Andre Lucien, to International Standard Electric Corporation. Time division system for synchronizing functions controlled by different clocks. 4,076,964, Cl. 179-15.0BS.
Herber, John F.; Richard, William R., Jr.; and Street, Robert W., to Monsanto Company. Novel monoepoxy compounds as acid scavengers in functional fluids. 4,076,642, Cl. 252-78.500.
Herbert, John T.; Kovitch, Frank J.; and Sullivan, Paul E., to Murdock Machine & Engineering Co. Ocean floor riser connection. 4,076,284, Cl. 285-263.000.
Hercofina: *See*—
Millick, William H., III, 4,076,946, Cl. 560-78.000.
Hercules Incorporated: *See*—
Armour, Donald F.; and Olmsted, Bernie A., 4,076,484, Cl. 425-525.000.
Rinard, James Franklin, 4,075,722, Cl. 5-351.000.
Hermann Hemscheidt Maschinenfabrik: *See*—
Klotz, Heinz; and Podszuck, Dietmar, 4,076,279, Cl. 285-26.000.
Herricks, Herman H.; and Easterwood, Richard L., to Shell Oil Company. Full bore fracture treating assembly. 4,076,079, Cl. 166-308.000.
Herrmann, Manfred: *See*—
Vigelius, Wolf-Dieter; Satzinger, Gerhard; and Herrmann, Manfred, 4,076,937, Cl. 544-171.000.
Hestermann, Klaus: *See*—
Lippsmeier, Bernd; and Hestermann, Klaus, 4,076,755 Cl. 260-606.50P.
Hetzel, Eckard; Koehler, Waldemar; Vock, Georg Friedrich; and Bittler, Rolf, to BASF Wyandotte Corporation. Process for the separation of residues of toluenediisocyanate production. 4,076,577, Cl. 159-47.00R.
Hewes, Charles Robert: *See*—
Buss, Dennis D.; and Hewes, Charles Robert, 4,076,960, Cl. 179-1.0SA.
Hexcel Corporation: *See*—
Baron, Seymour, 4,076,649, Cl. 252-440.000.
Hickman, Donald Price, to Inventec International Limited. Workbenches. 4,076,229, Cl. 269-139.000.
Hieronymus, Gerald Whitfield; Sendelweck, Michael Lynn; West, James Everett; and Woods, Joe William, to International Business Machines Corporation. Fast acting two-way valve. 4,076,046, Cl. 137-627.500.
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Hilker, Gloria D. Fireplace system. 4,076,490, Cl. 431-125.000.
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Hill, Richard D., II; and Mastronuzzi, Carl T., Jr. Flying disk. 4,075,781, Cl. 46-74.00D.
Hill, William Frank, to Lucas Electrical Co., Limited. Spark ignition systems for internal combustion engines. 4,075,997, Cl. 123-148.00E.
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Hendry, George O.; Hilton, John L.; and Kim, Jinchoon, 4,076,990, Cl. 313-61.00S.
Himmelrich, Lew. Utility coat with seating harness. 4,076,101, Cl. 182-3.000.
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Hire, William Russell. Folding boat. 4,075,724, Cl. 9-2.00F.
Hiruma, Mituo. Vehicle hydropneumatic suspension system with vehicle body height control means. 4,076,275, Cl. 280-124.00F.
Hisey, Robert W., to Gardner-Denver Company. Castering roller for a drill pipe guide bushing. 4,076,338, Cl. 308-4.00R.
Hisserich, Charles A. External compression ignition system for internal combustion engines. 4,075,996, Cl. 123-143.00A.
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Mukaemachi, Takuji; and Fukushima, Yutaka, 4,076,971, Cl. 179-175.30R.
Nakano, Fumio; Yokokura, Hisao; and Murao, Kenji, 4,076,646, Cl. 252-299.000.
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Eichenseer, Franz; Steidl, Dieter; and Muller, Walter, 4,076,935, Cl. 536-86.000.
Hartwimmer, Robert, 4,076,760, Cl. 260-653.10R.
Lippsmeier, Bernd; and Hestermann, Klaus, 4,076,755, Cl. 260-606.50P.
Riegler, Ernst, 4,075,736, Cl. 17-42.000.
Schmidt, Willi Johann, 4,076,785, Cl. 264-146.000.
Hoehn, Hans: *See*—
Denzel, Theodor; and Hoehn, Hans, 4,076,712, Cl. 260-256.40F.
Hoehn, Richard F.: *See*—
Behrends, Bertwin E.; Hoehn, Richard F.; and Poirot, James M., 4,076,219, Cl. 254-187.400.
Hoffman, Donald O.: *See*—
Deeg, Emil W.; and Hoffman, Donald O., 4,076,542, Cl. 106-52.000.
Hoffmann-La Roche Inc.: *See*—
Chan, Ka-Kong; and Saucy, Gabriel, 4,076,739, Cl. 260-410.90R.
Davis, Raymond Vincent, 4,076,797, Cl. 424-1.000.
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, 4,076,709, Cl. 544-48.000.
Kompis, Ivan, 4,076,810, Cl. 424-229.000.
Rosen, Perry, 4,076,944, Cl. 560-5.000.
Westley, John, 4,076,802, Cl. 424-122.000.
Westley, John, 4,076,834, Cl. 424-283.000.
Hoffmann, Werner; and von Fraunberg, Karl, to BASF Aktiengesellschaft. Polycyclic scents. 4,076,748, Cl. 260-586.00F.
Hoffmann, William A., III: *See*—
Zey, Edward G.; and Hoffmann, William A., III, 4,076,727, Cl. 260-340.700.
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Haigh, Harold Edward; and Hofmann, Dietrich Adolf, 4,076,200, Cl. 248-146.000.
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Wacker, Erich; Hofmann, Heinz; Kopp, Karl; Bauer, Hermann; von Ey, Volker; and Weiss, Franz, 4,075,934, Cl. 92-159.000.
Hofmann, Wilfried: *See*—
Deml, Reinhold; Greis, Ulrich; Hofmann, Wilfried; and Rauffer, Walter, 4,076,384, Cl. 350-122.000.
Hogan, David Charles: *See*—
Reid, Michael Gerald; Burlew, Leroy Ellery; and Hogan, David Charles, 4,076,408, Cl. 355-14.000.
Hoge, Myron W. Apparatus for detecting a high flange. 4,076,192, Cl. 246-247.000.
Hohenschutz, Heinz: *See*—
Buelow, Horst; Hohenschutz, Heinz; Schmidt, Johannes E.; and Sachsze, Werner, 4,076,594, Cl. 203-15.000.
Holdenried, Willy: *See*—
Hamma, Karlmann; and Holdenried, Willy, 4,075,841, Cl. 60-444.000.
Holland Company: *See*—
Chierici, Osvaldo F.; and Murphy, Richard F., 4,075,951, Cl. 105-199.00C.
Hollaway, John William, to Rio Tinto (Rhodesia) Limited. Process for obtaining liquid fuel-oil and/or gaseous hydrocarbons from solid carbonaceous feed stocks. 4,076,612, Cl. 208-8.000.
Holley, William H.: *See*—
White, LeRoy A.; and Holley, William H., 4,076,656, Cl. 260-2.50M.
Hollymatic Corporation: *See*—
Theis, James V., Jr.; Davis, Lynn M.; and Moss, Donald H., 4,076,449, Cl. 415-18.000.
Holmberg, Bradley C. Impact absorbing lock apparatus. 4,076,294, Cl. 292-340.000.
Holmes, Horace D. Locking thread construction. 4,076,064, Cl. 151-14.00R.
Holsinger, Jerry L.; and Williams, David E., to Intertel, Inc. Automatic switching unit for data communications network. 4,076,961, Cl. 179-2.0DP.
Holt, Ronald; and Smith, Daniel J., to Franklin Electric Subsidiaries, Inc. Wrapper sheet feed for wrapping machine. 4,075,816, Cl. 53-74.000.
Holzstoff. S.A.: *See*—
Brossel, Maurice; Laurent, Gilbert; and Bertannier, Daniel, 4,076,885, Cl. 428-286.000.
Homeyer, Bernhard: *See*—
Lorenz, Walter, deceased; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,076,806, Cl. 424-200.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Kuno, Tadashi; Abe, Akihiko; and Shoji, Akito, 4,076,001, Cl. 123-191.00S.
Yamazaki, Shuichi; Kajitani, Ikuo; and Kawamoto, Michio, 4,075,836, Cl. 60-282.000.
Honeywell Inc.: *See*—
Huang, Jack S. T.; and Kohyama, Susumu, 4,076,557, Cl. 148-1.500.
Honomichl, Ben K., Sr. Round bale loader and carrier. 4,076,138, Cl. 214-518.000.
Hopkins, Joseph; and McKenna, David, to Sir Howard Grubb Parsons & Company Ltd. Analysis of emulsions and suspensions. 4,076,983, Cl. 250-341.000.
Hori, Hironobu: *See*—
Otake, Nobuyuki; Ando, Kozo; and Hori, Hironobu, 4,076,428, Cl. 401-265.000.
Horn, Dieter: *See*—
Freyberg, Peter; Horn, Dieter; Oppenlaender, Knut; Wolf, Hans; and Distler, Dieter, 4,076,497, Cl. 8-21.00C.
Horn, Walter; and Fissler, Rudolf, to Fissler Gesellschaft mit beschrankter Haftung. Liquid feeding device for cooking containers. 4,075,939, Cl. 99-345.000.
Horne, Peter Nesbitt, to Patent Products Hydraulics (Proprietary) Limited. Decompression of pressure chambers, particularly the decompression of actuating pressure chambers of mine cage holding means. 4,075,839, Cl. 60-327.000.
Horrasby, James R., Jr. Amusement device incorporating simulated cheese and mice. 4,076,251, Cl. 273-138.00R.

Horowitz, Charles, to Sloan Valve Company. Tractor-trailer parking dash control valve with two-way check valve. 4,076,328, Cl. 303-50.000.
Horstmann, Harald; Meng, Karl; and Wehinger, Egbert, to Bayer Aktiengesellschaft. 1-Substituted-3-amino-pyrazol-5-ones. 4,076,943, Cl. 548-360.000.
Hortman, Norman G.: *See—*
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., 4,076,077, Cl. 166-315.000.
Hoshiden Electronics, Co., Ltd.: *See—*
Koide, Sakae; Aoki, Shigeo; and Uematsu, Tetsutaro, 4,075,791, Cl. 51-142.000.
Hosokawa, Takashi: *See—*
Nakajima, Hiroyuki; and Hosokawa, Takashi, 4,076,045, Cl. 137-625.650.
Houdaille Industries, Inc.: *See—*
Frazier, James L., 4,075,927, Cl. 90-11.00D.
Houghton, Benjamin T., to Enidine Incorporated. Adjustable energy absorbing device providing linear deceleration. 4,076,225, Cl. 267-34.000.
Housman, Richard J., to Westinghouse Air Brake Company. Friction mechanism for draft gear. 4,076,129, Cl. 213-33.000.
Houx, James R., Jr.; Landon, Richard D.; and Lindahl, Paul A., Jr., to Marley Cooling Tower Company, The. Bottom vented wet-dry water cooling tower. 4,076,771, Cl. 261-159.000.
Howard, Charles R. Fishing lure. 4,075,778, Cl. 43-42.310.
Howell, Roy M. Hydrostatic bearings with controlled lubricant pressure. 4,076,336, Cl. 308-3.500.
Howery, Kenneth A., to Polymetrics International Inc. Hydrophilic acrylic polymers as marine filters, algae growth catalysts, and breeding stimulus for fish and invertebrates. 4,076,619, Cl. 210-36.000.
Hoya Lens Corporation: *See—*
Onoki, Fumio; Namiki, Kazuo; and Osora, Tetsuo, 4,076,863, Cl. 427-165.000.
Hoyt, Joseph B., Jr.; and Shapiro, Eugene, to Olin Corporation. Wrought copper-silicon based alloys with enhanced elasticity and method of producing same. 4,076,560, Cl. 148-11.50C.
Hromatka, Otto; Binder, Dieter; Pfister, Rudolf; and Zeller, Paul, to Hoffmann-La Roche Inc. Thienothiazines. 4,076,709, Cl. 544-48.000.
Hrovat, Milan: *See—*
Hackstein, Karl-Gerhard; Hrovat, Milan; and Wolff, Willi, 4,076,775, Cl. 264-0.500.
Hruza, Denis E., Sr.: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.
Hsieh, Henry L.: *See—*
Moczygemba, George A.; and Hsieh, Henry L., 4,076,914, Cl. 526-25.000.
Huang, Jack S. T.; and Kohyama, Susumu, to Honeywell Inc. Method for providing semiconductor devices. 4,076,557, Cl. 148-1.500.
Hubbard, Harold C., to Motor Wheel Corporation. Remote control circuit for electric trailer brakes. 4,076,327, Cl. 303-20.000.
Hubele, Adolf; Kunz, Walter; and Eckhardt, Wolfgang, to Ciba-Geigy Corporation. Acylated phenylamine thiopropionates useful in combatting plant fungi. 4,076,836, Cl. 424-285.000.
Hubeny, Jerry. Tool for closing a wall opening. 4,075,749, Cl. 29-268.000.
Huber, Peter; Lampelzammer, Helga; Pirson, Ewald; and Wimmer, Franz, to Wacker-Chemie GmbH. Lubricants for organic fibres. 4,076,672, Cl. 260-29.20M.
Huber, Wolfgang: *See—*
Meinke, Peter; and Huber, Wolfgang, 4,076,340, Cl. 308-10.000.
Hudnall, Walter E. Adjustable chair-spindle assembly. 4,076,201, Cl. 248-162.000.
Huebner, Karen, to R. O. Hull & Company, Inc. Leveling agent for acid zinc electroplating baths and method. 4,076,600, Cl. 204-55.00R.
Huelskamp, Urban A., to MTM Molded Products Co. Hand launcher for clay pigeons. 4,076,004, Cl. 124-5.000.
Huettemann, Richard E.: *See—*
Mateos, Jose Luis; Noriega, Luis; Huettemann, Richard E.; and Kanojia, Ramesh M., 4,076,805, Cl. 424-195.000.
Hugelin, Bernard: *See—*
Decombe, Robert; and Hugelin, Bernard, 4,076,495, Cl. 8-2.50A.
Hughes Aircraft Company: *See—*
Gates, Louis E., Jr., 4,076,955, Cl. 174-52.0FP.
Kimura, Hiroshi, 4,076,572, Cl. 156-603.000.
Moyer, Norman E., 4,075,826, Cl. 58-23.00R.
Pastor, Ricardo C.; and Pastor, Antonio C., 4,076,574, Cl. 156-616.00R.
Humber, Leslie G.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 4,076,831, Cl. 424-274.000.
Hupkes, Leonard, to Conrad-Stork B.V. Device for the purpose of preventing a body depending from ropes from swinging. 4,076,127, Cl. 212-10.000.
Hupp, Walter: *See—*
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.
Hurst, Gerald L., to Tyler Corporation. Metal dispersions and method for producing same. 4,076,637, Cl. 252-26.000.
Hushower, Richard R.; and Daresh, George M., to Clark Equipment Company. Hydraulic steering system. 4,076,096, Cl. 180-133.000.
Hydril Company: *See—*
Olson, Richard A., 4,076,208, Cl. 251-1.00A.
HydroTech International, Inc.: *See—*
Sumner, Glen R., 4,076,130, Cl. 214-1.0PA.
Ichii, Takao: *See—*
Sasaki, Tohru; Terasaki, Syuuzi; and Ichii, Takao, 4,076,889, Cl. 428-333.000.
Ichimaru, Kazuto: *See—*
Azuma, Tomisaburo; Ichimaru, Kazuto; Tateno, Kouichi; and Murakami, Takeru, 4,076,545, Cl. 423-544.000.
Ichimura, Yoshiaki, to Japan Aviation Electronics Industry Ltd. Contact driver. 4,076,362, Cl. 339-75.0MP.
Ichiyanagi, Toshikazu: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.
ICI Americas Inc.: *See—*
Rearick, William A., 4,076,500, Cl. 8-139.100.
ICOS Corporation of America: *See—*
Tamaro, George John, 4,075,852, Cl. 61-35.000.
Ida, Edward Stanley, to Du Pont de Nemours, E. I., and Company. Multi-channel implicit ratio computer for sequential signals. 4,076,424, Cl. 356-188.000.
Ideal Toy Corporation: *See—*
Ventura, Frank D., 4,076,476, Cl. 425-183.000.
Igarashi, Masaaki: *See—*
Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, 4,076,861, Cl. 427-132.000.
Igarashi, Shunkichi; Okano, Takeshi; Takahama, Sho; and Hakamata, Yoshio, to Fuji Photo Film Co., Ltd. Process for producing microfilm copies and apparatus therefor. 4,076,412, Cl. 355-28.000.
Ihara Chemical Industry Co., Ltd.: *See—*
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, 4,076,721, Cl. 260-301.000.
Iida, Kosuke: *See—*
Yoshikawa, Yoshinobu; Iida, Kosuke; Morikawa, Tadayuki; and Satomi, Akinori, 4,076,567, Cl. 156-219.000.
Iinuma, Yoshio: *See—*
Murakami, Tomomi; Yoshida, Masaru; Kimura, Satoshi; Yasuda, Tetuya; and Iinuma, Yoshio, 4,075,825, Cl. 58-23.00R.
Ikeda, Sunao: *See—*
Kanno, Tadaaki; and Ikeda, Sunao, 4,076,402, Cl. 355-3.0DR.
Ikenoue, Shinpei; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Process for preparing silver halide dispersions. 4,076,539, Cl. 96-114.500.
Illinois Railway Equipment Co.: *See—*
Sweger, Theodore J., 4,076,290, Cl. 292-256.500.
Immunology Research Foundation, Inc.: *See—*
Burton, Lawrence; and Friedman, Frank, 4,076,701, Cl. 260-112.00B.
Imperial Chemical Industries Limited: *See—*
Giovanelli, Anton Alfred Arthur; and Schmidt, Eckhard Wolfgang, 4,076,874, Cl. 428-35.000.
Milner, David Lee; and Ripley, Ian Stanley, 4,076,926, Cl. 526-209.000.
Imura, Toshinori, to Minolta Camera Kabushiki Kaisha. Photographic camera employing a cartridge film. 4,077,041, Cl. 354-21.000.
Imura, Toshinori; Maeda, Keisuke; and Naya, Mikio, to Minolta Camera Kabushiki Kaisha. Control means for photoflash photography system. 4,077,042, Cl. 354-21.000.
Ina, Osamu: *See—*
Yamawaki, Masao; Aoki, Katsuo; Ina, Osamu; Suzuki, Takao; Oka, Yoshio; and Hara, Kunihiko, 4,075,972, Cl. 118-6.000.
Inada, Masami; and Kitamura, Kazuhiko, to Aisin Seiki Kabushiki Kaisha. Temperature responsive valve assembly. 4,076,172, Cl. 236-48.00R.
Incom International Inc.: *See—*
Irwin, Steve; and Moser, Dick, 4,075,904, Cl. 74-501.00P.
Industrial Grain Products, Limited: *See—*
Johannson, Harold P., 4,076,845, Cl. 426-19.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Azzalin, Bruno; and Bettini, Francesco, 4,076,160, Cl. 226-82.000.
Inmont Corporation: *See—*
Suskind, Stuart Paul; and Sova, Stanley George, 4,076,879, Cl. 428-113.000.
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased (by Saito, Nobuko, administrator); Yamada, Yujiro; and Niida, Taro, to Meiji Seika Kaisha, Ltd. Antibiotic SF-1623 substance and the production thereof. 4,076,588, Cl. 195-36.00C.
Inspiration Consolidated Copper Company: *See—*
Bilson, Edward A., 4,076,605, Cl. 204-108.000.
Institut Pasteur: *See—*
Fauve, Robert, 4,076,801, Cl. 424-92.000.
Interlake, Inc.: *See—*
McConnell, Kennedy, 4,076,202, Cl. 248-188.200.
International Business Machines Corporation: *See—*
Bodner, Ronald Eugene; and Kiscaden, Richard Craig, 4,077,060, Cl. 364-200.000.
Caricchio, Jerome Joseph, Jr.; and York, Edward Robert, 4,076,599, Cl. 204-47.000.
Chang, Kenneth, 4,076,575, Cl. 156-656.000.
Cistola, Anthony Bartholemew, 4,076,357, Cl. 339-17.00M.
Croisier, Alain; and Glaise, Rene, 4,076,986, Cl. 307-221.00D.

Csajka, Istvan Peter; and Ungerboeck, Gottfried, 4,077,021, Cl. 332-9.00R.
Hendriks, Ferdinand, 4,077,040, Cl. 346-75.000.
Hieronymus, Gerald Whitfield; Sendelweck, Michael Lynn; West, James Everett; and Woods, Joe William, 4,076,046, Cl. 137-627.500.
Kircher, Charles John; and Zappe, Hans Helmut, 4,075,756, Cl. 29-625.000.
Mathis, Joseph Richard, 4,077,011, Cl. 328-129.000.
Pole, Robert Vladimir; and Wollenmann, Hans Peter, 4,076,372, Cl. 350-6.900.
Rupprecht, Hans Stephen; and Schwenker, Robert Otto, 4,076,558, Cl. 148-1.500.
Yee, Yen Sung, 4,077,035, Cl. 340-347.0DA.

International Flavors & Fragrances Inc.: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.
Light, Kenneth K.; Spencer, Bette M.; Vinals, Joaquin F.; Kiwala, Jacob; Vock, Manfred Hugo; and Shuster, Edward J., 4,076,854, Cl. 426-538.000.
Schreiber, William L.; Siano, James N.; and Shuster, Edward J., 4,076,749, Cl. 260-586.00R.
Van Delft, Andries; and Giacino, Christopher, 4,076,852, Cl. 426-533.000.

International Standard Electric Corporation: *See—*
Henrion, Michel Andre Robert; and Coudray, Andre Lucien, 4,076,964, Cl. 179-15.0BS.

International Synthetic Rubber Company, Ltd., The: *See—*
de Larosiere de Champfeu, Pierre J., 4,075,853, Cl. 61-36.00R.

International Telephone and Telegraph Corporation: *See—*
Hammer, Richard Benjamin; Turbak, Albin Frank; Portnoy, Norman A.; and West, Arthur C., 4,076,932, Cl. 536-30.000.
Turbak, Albin Frank; Hammer, Richard Benjamin; Portnoy, Norman A.; and West, Arthur C., 4,076,933, Cl. 536-30.000.

Intertel, Inc.: *See—*
Holsinger, Jerry L.; and Williams, David E., 4,076,961, Cl. 179-2.0DP.

Inventec International Limited: *See—*
Hickman, Donald Price, 4,076,229, Cl. 269-139.000.

Inventing S.A.: *See—*
Wallsten, Hans Ivar, 4,076,864, Cl. 427-209.000.
Wallsten, Hans Ivar, 4,076,865, Cl. 427-209.000.

Ioffe, Benyamin Alexandrovich; Kalnin, Robert Karlovich; Zommer, Jury Arvidovich; Graubin, Yanis Ekabovich; Davydenko, Eduard Prokofievich; and Kern, Ivan Ivanovich. Method of oriented feeding of nonmagnetic current-conducting components and devices for effecting same. 4,077,027, Cl. 335-219.000.

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Iowa State University Research Foundation, Inc.: *See—*
Handy, Richard L.; Girard, Leon E.; Roorda, Bruce R.; and Pitt, John M., 4,075,885, Cl. 73-88.00E.

Ippolitov, Vladimir Vasilievich: *See—*
Kapitanov, Nikolai Nikolaevich; Ippolitov, Vladimir Vasilievich; Andreeva, Galina Dmitrievna; Petrova, Natalyd Petrovna; and Rabotnikov, Vladimir Semenovich, 4,076,162, Cl. 227-019.000.

Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., to Eastman Kodak Company. Bichromophoric benzotriazole-benzoxazole ultraviolet stabilizers and their use in organic compositions. 4,076,687, Cl. 260-45.8NT.

Irwin, Steve; and Moser, Dick, to Incom International Inc. Adapter for push-pull control cables. 4,075,904, Cl. 74-501.00P.

Ishiba, Teruyuki: *See—*
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,702, Cl. 260-112.50R.
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Ishiguro, Tatsuo, to Nippon Electric Company, Ltd. Television signal encoder utilizing a correlation between frames. 4,077,053, Cl. 358-136.000.

Ishioka, Yozo: *See—*
Kai, Fumindo; Kumazawa, Eitaro; and Ishioka, Yozo, 4,075,767, Cl. 34-92.000.

Issler, Jorg: *See—*
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Istituto Chemioterapico Italiano, S.p.A.: *See—*
Garzia, Aldo; Ferrari, William; and Bottazzi, Andrea, 4,076,815, Cl. 424-251.000.

Ito, Kanichi: *See—*
Hirayama, Yoshio; Ito, Kanichi; Takeuchi, Ryoichi; Nomoto, Masao; and Shiina, Tomoyuki, 4,076,177, Cl. 241-32.000.

Iwai, Tomio, to Yamaha Hatsudoki Kabushiki Kaisha. Two cycle internal combustion engines. 4,075,985, Cl. 123-73.00A.

Iwamatsu, Masayuki, to Nippon Gakki Seizo Kabushiki Kaisha. Amplifier devices. 4,077,012, Cl. 330-253.000.

Iwasaki, Takeshi; Fujikawa, Yasuo; and Sasaki, Kunimasa, to Mitsubishi Jukogyo Kabushiki Kaisha. Device for detecting level of molten metal surface within a continuous casting mold. 4,075,890, Cl. 73-295.000.

Iyeta, Motoi, to Nippon Gakki Seizo Kabushiki Kaisha. Apparatus for supporting phonographic tone arms. 4,076,257, Cl. 274-23.00A.

Izon Corporation: *See—*
Waly, Adnan, 4,076,415, Cl. 355-45.000.

J. I. Case Company: *See—*
Baylor, John Merlin, 4,076,333, Cl. 305-11.000.

J. M. Huber Corporation: *See—*
Wason, Satish K., 4,076,549, Cl. 106-288.00B.

J. T. Baker Chemical Company: *See—*
Seidenberger, James W., 4,076,553, Cl. 134-6.000.

Jackson, John Lambert: *See—*
Archibald, John Leheup; and Jackson, John Lambert, 4,076,820, Cl. 424-258.000.

Jacques, Petrus: *See—*
Mar, John; Garrett, Todd; and Jacques, Petrus, 4,075,725, Cl. 9-8.00R.

Jacques, Roland, to Rhone-Poulenc Industries. Agglomerated siliceous bodies. 4,076,651, Cl. 252-451.000.

Jagielski, David: *See—*
Persha, Thomas J.; and Jagielski, David, 4,076,400, Cl. 353-95.000.

James David Incorporated: *See—*
Glaser, Harold, 4,076,432, Cl. 403-176.000.

Janev, Janco Hristov: *See—*
Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, 4,076,521, Cl. 75-24.000.

Jankot, Alan Lewis, to United Technologies Corporation. Ceramic turbine stator. 4,076,451, Cl. 415-217.000.

Japan Aviation Electronics Industry Ltd.: *See—*
Ichimura, Yoshiaki, 4,076,362, Cl. 339-75.0MP.

Japan Synthetic Rubber Co., Ltd.: *See—*
Harada, Tetsuya; and Yumoto, Tunemasa, 4,076,700, Cl. 260-97.600.

Jaworski, Eugene: *See—*
Breslow, Jeffrey D.; and Jaworski, Eugene, 4,076,006, Cl. 124-64.000.

Jean Walterscheid GmbH: *See—*
Geisthoff, Hubert, 4,075,872, Cl. 64-23.700.
Geisthoff, Hubert, 4,075,873, Cl. 64-29.000.

Jekov, Velyu Dimitrov: *See—*
Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, 4,076,521, Cl. 75-24.000.

Jenaer Glaswerk Schott & Gen.: *See—*
Faulstich, Marga; and Reitmayer, Franz, 4,076,647, Cl. 252-301.40P.

Jenkin, Royston Paul, to English Clays Lovering Pochin & Co. Ltd. Pipe straightening and spinning method and apparatus. 4,076,136, Cl. 214-340.000.

Jenne, Frank, Jr.; and Tarnay, Denes, to General Electric Company. Rectangular seal beam lamp unit. 4,076,143, Cl. 220-2.10R.

Jensen, Aksel Johannes: *See—*
Remark, Preben Michael; and Jensen, Aksel Johannes, 4,075,742, Cl. 24-211.00R.

Jensen, Henry E., to Eltra Corporation. Apparatus for indicating battery cell condition. 4,076,906, Cl. 429-90.000.

Jesswein, Ronald M., to Clark Equipment Company. Brake and steering system. 4,075,840, Cl. 60-422.000.

Jirkovsky, Ivo L.: *See—*
Demerson, Christopher A.; Humber, Leslie G.; Dobson, Thomas A.; and Jirkovsky, Ivo L., 4,076,831, Cl. 424-274.000.

Johannson, Harold P., to Industrial Grain Products, Limited. Process for using a powdered gluten composition in baking. 4,076,845, Cl. 426-19.000.

John Morgan Printing Machinery Ltd.: *See—*
Morgan, John Henry, 4,076,184, Cl. 242-75.300.

John Wyeth & Brother, Limited: *See—*
Archibald, John Leheup; and Jackson, John Lambert, 4,076,820, Cl. 424-258.000.

Johns, Robert W. Hydraulic mining from tunnel by reciprocated pipes. 4,076,311, Cl. 299-2.000.

Johnson, David G.; and Mueller, James P., to Caterpillar Tractor Co. Brake modulation valve for pedal-applied brakes. 4,076,329, Cl. 303-56.000.

Johnson, Joe, Jr., to Coats & Clark, Inc. Method and apparatus for feeding a bale press. 4,075,942, Cl. 100-42.000.

Johnson, Lloyd D.: *See—*
Raudat, John L.; and Johnson, Lloyd D., 4,075,819, Cl. 53-248.000.

Johnson, Richard Shaw; and Potter, John Kenneth, to Thomas J. Lipton, Inc. Tea-colored flavor granules. 4,076,847, Cl. 426-78.000.

Johnston, Paul M.; and Szabo, Andras I., to Westinghouse Electric Corporation. Digital processing and calculating AC electric energy metering system. 4,077,061, Cl. 364-483.000.

Johnston, Ross W., to Sperry Rand Corporation. High speed actuator for impact line printers. 4,075,943, Cl. 101-93.480.

Joiner, James Ray, Jr., to Du Pont de Nemours, E. I., and Company. Low lag luminescent phosphors and X-ray screen containing the same. 4,076,897, Cl. 428-539.000.

Joly, Pascal Adrien Jean; and Prat, Jean-Claude Alphonse Henri, to Corning Glass Works. Glass for encapsulation of diodes. 4,076,543, Cl. 106-53.000.

Jones, John L., to CanDu, Inc. Method for hydroponic growing of lettuce. 4,075,785, Cl. 47-64.000.

Jones, Paul T. Recorder for measuring movement of railroad track rails under load. 4,075,889, Cl. 73-146.000.

Jones, Ray L., to Whittaker Corporation. Automatic pump speed controller. 4,076,458, Cl. 417-46.000.

Jones, William C.: *See*—
Beaumont, Gerald P.; and Jones, William C., 4,076,629, Cl. 252-8.600.

Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, to Kombinat Za Zventi Metali "Dimiter Blagoev". Method for continuously blowing materials into molten slags. 4,076,521, Cl. 75-24.000.

Joseph, Mark. Game device with a playing surface of pressurized air. 4,076,242, Cl. 273-85.00B.

Josten, Friedrich: *See*—
Cherubim, Martin; Heinemann, Karl-Heinz; and Josten, Friedrich, 4,076,683, Cl. 260-37.00N.

Jovin, Thomas M.: *See*—
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.

Julius Blum Gesellschaft m.b.H.: *See*—
Rock, Erich; and Mages, Bernhard, 4,075,735, Cl. 16-145.000.

Jungles, John; Whitehouse, David John; and Nightingale, Eric Gordon, to Rank Organisation Limited, The. Optical diffractometers. 4,077,048, Cl. 358-89.000.

Justus, Marvin W.: *See*—
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., 4,076,457, Cl. 417-45.000.

Juttner, Willi: *See*—
Weidner, Hans Jurgen; and Juttner, Willi, 4,076,352, Cl. 312-330.00R.

Kabushiki Kaisha Daini Seikosha: *See*—
Hamano, Tadashi, 4,076,496, Cl. 8-4.000.
Kondo, Kenichi, 4,076,385, Cl. 350-332.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Yasoshima, Kazuo, 4,076,107, Cl. 192-4.00A.

Kabushiki Kaisha Mitutoyo Seisakusho: *See*—
Yamaryo, Yasuyuki, 4,075,763, Cl. 33-172.00R.

Kabushiki Kaisha Pollution Preventing Research Laboratory: *See*—
Suzuki, Shin; Matsumoto, Kazuo; and Nakaoka, Ichiro, 4,076,606, Cl. 204-157.10R.

Kabushiki Kaisha Sato Gijutsu Kenkyusho: *See*—
Oshida, Naoichi; and Ando, Eiichi, 4,076,504, Cl. 23-277.00C.

Kabushiki Kaisha Sogo Pump Seisakusho: *See*—
Tsukube, Syozo, 4,076,179, Cl. 241-46.110.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Araki, Hidejiro; and Otani, Susumu, 4,075,732, Cl. 15-301.000.
Komura, Ikuo; Tamai, Hideo; and Morita, Takayuki, 4,075,919, Cl. 83-676.000.

Kachurka, Alexandr Nikolaevich: *See*—
Barannik, Ivan Andreevich; Kachurka, Alexandr Nikolaevich; Zharovsky, Ivan Vasilievich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; and Mazurkevich, Alexandr Borisovich, 4,076,472, Cl. 425-8.000.

Kagerhuber, Franz: *See*—
Scheurecker, Werner; and Kagerhuber, Franz, 4,076,341, Cl. 308-20.000.

Kai, Fumindo; Kumazawa, Eitaro; and Ishioka, Yozo, to Snow Brand Milk Products Co., Ltd. Powder producing apparatus. 4,075,767, Cl. 34-92.000.

Kaido, Hiroyuki: *See*—
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.

Kaiser Aluminum & Chemical Corporation: *See*—
Andersen, John N., 4,076,603, Cl. 204-98.000.
Panusch, Erwin; Sobolev, Igor; and Carniglia, Stephen C., 4,076,580, Cl. 162-159.000.

Kaiser Glass Fiber Corporation: *See*—
Coggin, Charles H., Jr., 4,076,181, Cl. 242-18.00G.

Kaiser Steel Corporation: *See*—
Oswald, Donald E., 4,075,975, Cl. 118-318.000.

Kajitani, Ikuo: *See*—
Yamazaki, Shuichi; Kajitani, Ikuo; and Kawamoto, Michio, 4,075,836, Cl. 60-282.000.

Kalippke, Harald: *See*—
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Kalka, James C., to Minnesota Mining and Manufacturing Company. Retaining clip. 4,076,204, Cl. 248-500.000.

Kalnin, Robert Karlovich: *See*—
Ioffe, Benyamin Alexandrovich; Kalnin, Robert Karlovich; Zommer, Jury Arvidovich; Graubin, Yanis Ekabovich; Davydenko, Eduard Prokofievich; and Kern, Ivan Ivanovich, 4,077,027, Cl. 335-219.000.

Kamata, Jyoji: *See*—
Yamamoto, Toshio; Kamata, Jyoji; Murase, Shigeo; and Yamaguchi, Kouichirou, 4,076.073, Cl. 165-53.000.

Kamath, Venkatesh: *See*—
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.

Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, to Boehringer Mannheim GmbH. Aminopropanol compounds and compositions for the treatment of cardiac and circulatory diseases. 4,076,829, Cl. 424-274.000.

Kamyr, Inc.: *See*—
Golston, Stefan, 4,076,623, Cl. 210-77.000.

Kanazawa, Atsushi: *See*—
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.

Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, to Yokohama Rubber Co., Ltd., The. Rubber composition. 4,076,668, Cl. 260-23.70M.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.

Kanik, Robert W., to R. Kanik Sales, Ltd. Power driven log splitter. 4,076,062, Cl. 144-193.00A.

Kanno, Tadaaki; and Ikeda, Sunao, to Ricoh Company, Ltd. Electrophotographic apparatus with detachable photoconductive drum. 4,076,402, Cl. 355-3.0DR.

Kanojia, Ramesh M.: *See*—
Mateos, Jose Luis; Noriega, Luis; Huettemann, Richard E.; and Kanojia, Ramesh M., 4,076,805, Cl. 424-195.000.

Kantor, Ilya Solomonovich: *See*—
Soschenko, Evgeny Maximovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; Chizhikov, Anatoly Petrovich; and Volyansky, Igor Igorievich, 4,075,947, Cl. 104-23.0FS.

Kapitanov, Nikolai Nikolaevich; Ippolitov, Vladimir Vasilievich; Andreeva, Galina Dmitrievna; Petrova, Natalyd Petrovna; and Rabotnikov, Vladimir Semenovich. Surgical instrument for suturing vessels with metal staples. 4,076,162, Cl. 227-019.000.

Kaplan, Saul; Merianos, John J.; Green, Harold A.; and Petrocci, Alfonso N., to Kewanne Industries, Inc. Amphoteric surfactants. 4,076,744, Cl. 260-501.190.

Kardashov, David Alexeevich: *See*—
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Karl Mayer Textilmaschinenfabrik GmbH: *See*—
Mista, Kresimir; and Gerstner-Stevens, Ditmar, 4,075,744, Cl. 28-224.000.

Karl Schmidt GmbH: *See*—
Wacker, Erich; Hofmann, Heinz; Kopp, Karl; Bauer, Hermann; von Ey, Volker; and Weiss, Franz, 4,075,934, Cl. 92-159.000.

Karlsson, Jack. Device for limiting the consumption of objects in a container. 4,076,118, Cl. 206-268.000.

Karrer, Friedrich Wilhelm Johann; and Mellgren, Per Gustaf, to Karrer System AG. Process and device for drying fibrous material. 4,075,765, Cl. 34-20.000.

Karrer System AG: *See*—
Karrer, Friedrich Wilhelm Johann; and Mellgren, Per Gustaf, 4,075,765, Cl. 34-20.000.

Kas, Gunter: *See*—
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Kasagi, Takao: *See*—
Kuwakado, Satosi; Kasagi, Takao; and Takei, Toshihiro, 4,076,277, Cl. 280-738.000.

Kashiwa, Norio: *See*—
Toyota, Akinori; Odawara, Kiyoshi; and Kashiwa, Norio, 4,076,924, Cl. 526-125.000.

Kason Hardware Corporation: *See*—
Berkowitz, Irving L., 4,076,429, Cl. 403-2.000.

Kasper, George Philip; and May, John Walter, to Eastman Kodak Company. Process for developing electrographic images by causing electrical breakdown in the developer. 4,076,857, Cl. 427-18.000.

Kassner, Karl-Heinz, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Adhesives based on aqueous dispersions of butadiene copolymers, polyvinylpyrrolidones and anionic macromolecular compounds. 4,076,661, Cl. 260-17.00R.

Kasulanis, Charles Francis: *See*—
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,076,722, Cl. 260-307.00H.

Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Method of polymerizing vinyl chloride. 4,076,951, Cl. 526-62.000.

Kato, Hajime: *See*—
Tsuji, Nobuo; Ishige, Sadao; Miyamoto, Akio; and Kato, Hajime, 4,076,887, Cl. 428-307.000.
Kato, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for controlling supply of fuel to internal combustion engine. 4,075,988, Cl. 123-97.00B.
Katz, Menasha Emanuel. Safety holster. 4,076,156, Cl. 224-2.00B.
Kauhl, Gunther: *See*—
Krauss, Heinz; Kauhl, Gunther; and Steinke, Leo, 4,075,998, Cl. 123-179.00H.
Kawamoto, Michio: *See*—
Yamazaki, Shuichi; Kajitani, Ikuo; and Kawamoto, Michio, 4,075,836, Cl. 60-282.000.
Kawamoto, Toshiaki: *See*—
Ohsaki, Mikio; Kawamoto, Toshiaki; and Fujimoto, Osamu, 4,076,125, Cl. 209-80.500.
Kawashima, Hideyuki: *See*—
Yoshida, Makoto; Mochizuki, Yoshifumi; Yamauchi, Masamichi; and Kawashima, Hideyuki, 4,075,827, Cl. 58-23.0AC.
Keck, Mark. Rotary-poppet valve internal combustion engine. 4,075,986, Cl. 123-79.00R.
Keezer, Richard C.; and Haas, Werner E. L., to Xerox Corporation. Electrostatic copying process with charging of the original. 4,076,858, Cl. 427-19.000.
Kefeli, Tamara Yakovlevna: *See*—
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.
Keil, Joseph W., to Dow Corning Corporation. Silicone containing reaction injection molded polyurethanes. 4,076,695, Cl. 260-77.5AM.
Keith, Donald B., to Nordam. Building roof panel. 4,075,811, Cl. 52-395.000.
Kellwood Company: *See*—
Bareis, Marvin A.; and Nisbet, George C., 4,075,723, Cl. 9-1.500.
Kelly, Charles A.: *See*—
Irick, Gether, Jr.; Kelly, Charles A.; and Martin, James C., 4,076,687, Cl. 260-45.8NT.
Kelly, Joseph B., to PPG Industries, Inc. Insulated tongs for supporting glass sheets during press bending to V shapes and process of use. 4,076,514, Cl. 65-106.000.
Kelly, Ralph: *See*—
Willer, Sharon Gail; Yust, Paul Ronald; and Kelly, Ralph, 4,076,799, Cl. 424-45.000.
Kendall Company, The: *See*—
Collins, Robert F., 4,075,716, Cl. 2-114.000.
Kenjo, Takenori: *See*—
Tsuda, Yoshinao; Arita, Masafumi; Hamasaki, Toshio; Tsumagari, Tatsumi; and Kenjo, Takenori, 4,076,821, Cl. 424-263.000.
Kennedy Van Saun Corporation: *See*—
Gardner, Kenneth L., 4,076,493, Cl. 432-77.000.
Kerko, David J.; and Tick, Paul A., to Corning Glass Works. Copper-cadmium-silver photochromic glass. 4,076,544, Cl. 106-54.000.
Kern, Ivan Ivanovich: *See*—
Ioffe, Benyamin Alexandrovich; Kalnin, Robert Karlovich; Zommer, Jury Arvidovich; Graubin, Yanis Ekabovich; Davydenko, Eduard Prokofievich; and Kern, Ivan Ivanovich, 4,077,027, Cl. 335-219.000.
Kewanne Industries, Inc.: *See*—
Kaplan, Saul; Merianos, John J.; Green, Harold A.; and Petrocci, Alfonso N., 4,076,744, Cl. 260-501.190.
KHD Industrienlagen AG: *See*—
Haude, Friedhelm, 4,076,178, Cl. 241-33.000.
Kida, Masashi: *See*—
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.
Kilbourn, Edward E.: *See*—
Weir, W. David; and Kilbourn, Edward E., 4,076,809, Cl. 424-211.000.
Kilgariff Holdings Pty. Ltd.: *See*—
Kilgariff, Thomas A., 4,076,209, Cl. 251-251.000.
Kilgariff, Thomas A., to Kilgariff Holdings Pty. Ltd. Improved tap. 4,076,209, Cl. 251-251.000.
Kim, Jinchoon: *See*—
Hendry, George O.; Hilton, John L.; and Kim, Jinchoon, 4,076,990, Cl. 313-61.00S.
Kim, Raymond W. H.; and Figge, Erwin E., to Bell & Howell Company. Moving target assembly and control. 4,076,247, Cl. 273-105.600.
Kimoto, Takahiro: *See*—
Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, 4,076,721, Cl. 260-301.000.
Kimura, Hiroshi, to Hughes Aircraft Company. Crystal growth and anneal of lead tin telluride by recrystallization from a heterogeneous system. 4,076,572, Cl. 156-603.000.
Kimura, Satoshi: *See*—
Murakami, Tomomi; Yoshida, Masaru; Kimura, Satoshi; Yasuda, Tetuya; and Iinuma, Yoshio, 4,075,825, Cl. 58-23.00R.
King Nutronics Corporation: *See*—
Waldron, Bradley C., 4,075,882, Cl. 73-1.00F.
Kingsley, William, to Xerox Corporation. Photoconductor incrementing apparatus. 4,076,183, Cl. 242-67.30R.
Kircher, Charles John; and Zappe, Hans Helmut, to International Business Machines Corporation. Process for fabricating above and below ground plane wiring on one side of a supporting substrate and the resulting circuit configuration. 4,075,756, Cl. 29-625.000.
Kirchgessner, Edwin M.; and Krohn, Dennis G., to Caterpillar Tractor Co. Gas-liquid separators. 4,075,984, Cl. 123-41.540.
Kirk, Russell F.: *See*—
Fahlen, Theodore S.; and Kirk, Russell F., 4,077,018, Cl. 331-94.5PE.
Kiscaden, Richard Craig: *See*—
Bodner, Ronald Eugene; and Kiscaden, Richard Craig, 4,077,060, Cl. 364-200.000.
Kiser, Gary L.; and Hendricks, Bobby G., to Du Pont de Nemours, E. I., and Company. Formaldehyde manufacturing process. 4,076,754, Cl. 260-603.00C.
Kishner, Stanley J., to Kollmorgen Technologies Corporation. Spectrophotometer with parallel sensing. 4,076,421, Cl. 356-96.000.
Kissick, Thomas P.: *See*—
Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,076,823, Cl. 424-269.000.
Kistner, Hermann; and Lehmann, Gunthart, to Maschinenbau Oppenweiler GmbH. Device for cutting a pile of sheets with a disk-knife. 4,075,917, Cl. 83-422.000.
Kistner, Hermann; and Lehmann, Gunthart, to Maschinenbau Oppenweiler GmbH. Apparatus for lifting and conveying a signature fed on a wedge-shaped saddle. 4,076,232, Cl. 270-54.000.
Kita, Atsushi: *See*—
Shimizu, Akihiko; and Kita, Atsushi, 4,076,927, Cl. 526-217.000.
Kita, Toru: *See*—
Fujishiro, Takeshi; and Kita, Toru, 4,076,608, Cl. 204-195.00S.
Kita, Toshio: *See*—
Nakashima, Katsutoshi; Kita, Toshio; Osawa, Ryuzo; and Hatanaka, Takashi, 4,076,220, Cl. 366-69.000.
Kitagawa, Norihisa; and White, Lionel Stuart, Jr., to Texas Instruments Incorporated. High speed address buffer for semiconductor memory. 4,077,031, Cl. 365-205.000.
Kitamura, Kazuhiko: *See*—
Inada, Masami; and Kitamura, Kazuhiko, 4,076,172, Cl. 236-48.00R.
Kitani, Fukuichi: *See*—
Koyama, Yasujiro; Kitani, Fukuichi; and Nishi, Masaaki, 4,075,812, Cl. 52-747.000.
Kitano, Noritoshi: *See*—
Seki, Isao; Kitano, Noritoshi; and Kondo, Fusao, 4,076,814, Cl. 424-248.500.
Kiwala, Jacob: *See*—
Light, Kenneth K.; Spencer, Bette M.; Vinals, Joaquin F.; Kiwala, Jacob; Vock, Manfred Hugo; and Shuster, Edward J., 4,076,854, Cl. 426-538.000.
Klank, Otto; and Rottmann, Dieter, to Licentia Patent-Verwaltungs-G.m.b.H. Tuning circuit for high frequency receivers. 4,077,009, Cl. 325-455.000.
Klaubert, Dieter H.: *See*—
Sellstedt, John H.; and Klaubert, Dieter H., 4,076,718, Cl. 260-295.0PA.
Kleider, Albert: *See*—
Vogel, Eberhard; Glaser, Herbert; Kleider, Albert; and Dietz, Klaus, 4,075,793, Cl. 51-170.0TL.
Kleinschwarzer, Adolf: *See*—
Wohlfarth, Ernst; Hechtl, Wolfgang; Matejcek, Klaus; and Kleinschwarzer, Adolf, 4,076,684, Cl. 260-37.0SB.
Kleker, Richard G. Method and apparatus for hematology. 4,076,419, Cl. 356-39.000.
Klesper, Hugo: *See*—
Busse, Oswald; and Klesper, Hugo, 4,076,033, Cl. 134-172.000.
Kling-Tecs, Inc.: *See*—
Roberts, John S., 4,075,743, Cl. 28-263.000.
Roberts, John S., 4,075,746, Cl. 28-264.000.
Klingenberg, Hans Ulrich, to Century Time Limited. Four-sided water-resistant watch-case. 4,075,828, Cl. 58-90.00R.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Mettig, Hermann; and Medenus, Bernhard, 4,075,991, Cl. 123-119.0CD.
Klose, Klaus, to AGFA-Gevaert, A.G. Apparatus for processing cassettes containing exposed photographic films. 4,076,135, Cl. 214-300.000.
Klotz, Heinz; and Podszuck, Dietmar, to Hermann Hemscheidt Maschinenfabrik. Plug-in coupling. 4,076,279, Cl. 285-26.000.
Klundt, Kurt, to Pfaff Industriemaschinen GmbH. Lubricating oil sealing device for a sewing machine. 4,075,960, Cl. 112-256.000.
Knight, Clifford; and Thorp, Peter M., to Xerox Corporation. Document handling apparatus. 4,076,233, Cl. 271-233.000.
Kobeski, Walter Dan; Srocki, Sigismund Walter; Blosser, William Ivan; and Needham, James Joseph, to United States Gypsum Company. Method of treating earthen areas. 4,076,862, Cl. 427-136.000.
Kobozev, Vladimir Nikolaevich: *See*—
Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.
Koch, Engelbert: *See*—
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.

Koch, Franklin O., Jr., to Caterpillar Tractor Co. Radially moving trigger mechanism and transmission overspeed inhibitor using same. 4,075,893, Cl. 74-3.000.

Koch, Karlheinz; and Rutzen, Horst, to Henkel KGaA; and Durtsche Gold- und Silber-Scheideanstalt vormals Roessler. Novel betaines, processes for the preparation thereof and recovery of underground petroleum therewith. 4,076,743, Cl. 260-501.130.

Koehler, Waldemar: *See—*
Hetzel, Eckard; Koehler, Waldemar; Vock, Georg Friedrich; and Bittler, Rolf, 4,076,577, Cl. 159-47.00R.

Koenig & Bauer Aktiengesellschaft: *See—*
Kutzner, Willi Albert Peter; and Schneider, Georg, 4,076,231, Cl. 270-21.000.

Koenig, Elmer A., to Sherwood Medical Industries Inc. Fluid transfer device. 4,076,027, Cl. 128-272.000.

Koeppel, Robert: *See—*
Grimaud, Edouard; and Koeppel, Robert, 4,076,699, Cl. 260-79.50C.

Koestering, Ernest J.: *See—*
Alper, Marc H.; and Koestering, Ernest J., 4,075,801, Cl. 52-196.000.

Kogler, Hubert P., to Ashland Oil, Inc. Cyanoacrylate foundry binders and process. 4,076,685, Cl. 260-42.530.

Kohno, Tsuguo, to Agency of Industrial Science & Technology. Fabry-Perot interference spectrometer. 4,076,422, Cl. 356-106.00S.

Kohyama, Susumu: *See—*
Huang, Jack S. T.; and Kohyama, Susumu, 4,076,557, Cl. 148-1.500.

Koide, Sakae; Aoki, Shigeo; and Uematsu, Tetsutaro, to Tahara Shoyei Kiko K.K.; and Hoshiden Electronics, Co., Ltd. Automatic copying belt grinding machine. 4,075,791, Cl. 51-142.000.

Koike, Wataro; Kimoto, Takahiro; and Matsui, Sadayoshi, to Ihara Chemical Industry Co., Ltd. Process for producing saccharin. 4,076,721, Cl. 260-301.000.

Koizumi, Kunihei; Ueda, Takeshi; and Otani, Tatu, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for controlling heat input to a waste heat boiler by use of bleeder gas from a coke dry quenching station. 4,076,593, Cl. 201-39.000.

Kojima, Michio: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.

Kojima, Minoru: *See—*
Yukuta, Toshio; Ohashi, Takashi; Kojima, Minoru; and Suzuki, Akira, 4,076,654, Cl. 260-2.5AM.

Kolb, Alfred: *See—*
Gross, Marvin H.; and Kolb, Alfred, 4,075,802, Cl. 52-203.000.

Kolbeck, Rainer; Kuckenburg, Heinz; and Schaffernicht, Klaus, to Licentia Patent-Verwaltungs-G.m.b.H. Electron beam producing arrangement for a cathode ray tube. 4,076,995, Cl. 313-446.000.

Koleske, Joseph Victor; and Smith, Oliver Wendell, to Union Carbide Corporation. Blends of aqueous acrylic latex and water soluble carboxyl modified polycaprolactone adduct. 4,076,674, Cl. 260-29.4UA.

Kollmorgen Technologies Corporation: *See—*
Kishner, Stanley J., 4,076,421, Cl. 356-96.000.

Komarova, Ljudmila Grigorievna: *See—*
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Kombinat Za Zventi Metali "Dimiter Blagoev": *See—*
Jordanov, Jordan Todorov; Abrashev, Georgi Ivanov; Jekov, Velyu Dimitrov; Georgiev, Georgi Taney; Haralampiev, Georgi Alexandrov; Janev, Janco Hristov; and Prodanov, Velcho Angelov, 4,076,521, Cl. 75-24.000.

Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, to Canon Kabushiki Kaisha. Cinecamera equipment capable of synchronous sound recording. 4,076,396, Cl. 352-29.000.

Kompis, Ivan, to Hoffmann-La Roche Inc. Benzylpyrimidine antibacterial composition. 4,076,810, Cl. 424-229.000.

Komura, Ikuo; Tamai, Hideo; and Morita, Takayuki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Cutting blade of a device for cutting a yarn in a textile machine. 4,075,919, Cl. 83-676.000.

Konan Electric Co., Ltd.: *See—*
Nakajima, Hiroyuki; and Hosokawa, Takashi, 4,076,045, Cl. 137-625.650.

Kondo, Fusao: *See—*
Seki, Isao; Kitano, Noritoshi; and Kondo, Fusao, 4,076,814, Cl. 424-248.500.

Kondo, Kenichi, to Kabushiki Kaisha Daini Seikosha. Liquid crystal display device. 4,076,385, Cl. 350-332.000.

Kondo, Yasumitsu: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.

Kondratenko, Feofan Ilich: *See—*
Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.

Konicek, Jiri K.: *See—*
Malm, Hans R.; Nilsson, Peter J.; and Konicek, Jiri K., 4,075,757, Cl. 29-625.000.

Konishi Co., Ltd.: *See—*
Nagasawa, Shigeru; and Okitsu, Toshinao, 4,075,830, Cl. 260-18.00N.

Konkhina, Ljudmila Alexeevna: *See—*
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Kono, Tateomi; and Kuwako, Takashi, to Minolta Camera Kabushiki Kaisha. Photoreceptor drum for use in electrophotographic copying apparatus. 4,076,410, Cl. 355-16.000.

Koponen, Martti: *See—*
Koski, Erkki; Veijonen, Lassi; and Koponen, Martti, 4,075,768, Cl. 34-116.000.

Kopp, Karl: *See—*
Wacker, Erich; Hofmann, Heinz; Kopp, Karl; Bauer, Hermann; von Ey, Volker; and Weiss, Franz, 4,075,934, Cl. 92-159.000.

Korenblit, Shalom. Easy chairs. 4,076,303, Cl. 297-30.000.

Korsgaard, Jens. Method and apparatus for binding a book. 4,075,726, Cl. 11-1.00R.

Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich. Composition for antifriction material. 4,076,634, Cl. 252-12.000.

Kosiolek, Klaus Peter: *See—*
Diesinger, Walter Helmut; and Kosiolek, Klaus Peter, 4,075,832, Cl. 60-245.000.

Koski, Erkki; Veijonen, Lassi; and Koponen, Martti, to Valmet Oy. Multicylinder dryer. 4,075,768, Cl. 34-116.000.

Kotten Machine Co. of Calif. Inc.: *See—*
Marano, John Francis, 4,076,480, Cl. 425-364.00B.

Kovitch, Frank J.: *See—*
Herbert, John T.; Kovitch, Frank J.; and Sullivan, Paul E., 4,076,284, Cl. 285-263.000.

Koyama, Tsuneo: *See—*
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.

Koyama, Yasujiro; Kitani, Fukuichi; and Nishi, Masaaki, to Nippon Kokan Kabushiki Kaisha. Refractory checkerwork. 4,075,812, Cl. 52-747.000.

Kracklauer, John J., to Syntex (U.S.A.) Inc. Polyurethane smoke suppression additive. 4,076,657, Cl. 260-2.5AJ.

Kraftwerk Union Aktiengesellschaft: *See—*
Michel, Rupprecht, 4,075,979, Cl. 122-235.00A.

Krahe, James B., to American Sterilizer Company. Inflatable pouch to seal. 4,075,787, Cl. 49-209.000.

Kramer, Manfred, to Robert Bosch GmbH. Fuel injection system. 4,075,995, Cl. 123-139.0AW.

Krasnov, Alexandr Petrovich: *See—*
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Krauss, Heinz; Kauhl, Gunther; and Steinke, Leo, to Robert Bosch GmbH. Electrical on-off-starting operation control system for engines requiring pre-heat time, such as automotive Diesel engines. 4,075,998, Cl. 123-179.00H.

Krausz, Howard I. Brake assembly for skateboard. 4,076,266, Cl. 280-87.04A.

Krechel, Joseph L.; and Purvis, Michael J., to Control Devices, Incorporated. Ball valve. 4,076,211, Cl. 251-286.000.

Kreider, Eunice M., to G. D. Searle & Co. Derivatives of 1-(3-cyano-3,3-diphenylpropyl)-4-phenylpiperidine-4-carboxylic acid. 4,076,717, Cl. 260-293.750.

Kreidler, Alfred, to Metall-Invent S.A. Method of and device for making rods, tubes and profiled articles. 4,075,881, Cl. 72-270.000.

Kress, Dieter; and Haberle, Friedrich, to MAPAL Fabrik fur Prazisionswerkzeuge Dr. Kress KG. Multiple blade reamer. 4,076,445, Cl. 408-226.000.

Kring, Elbert Victor, to Du Pont de Nemours, E. I., and Company. Electrochemical gas electrode. 4,076,899, Cl. 429-42.000.

Krogmann, Uwe; and Wurditsch, Uwe, to Bodenseewerk Geratetechnik GmbH. Device for determining the north direction. 4,075,764, Cl. 33-324.000.

Krohn, David A.: *See—*
Deeg, Emil W.; and Krohn, David A., 4,076,395, Cl. 351-165.000.

Krohn, Dennis G.: *See—*
Kirchgessner, Edwin M.; and Krohn, Dennis G., 4,075,984, Cl. 123-41.540.

Krongauz, Evgenia Semenovna: *See—*
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Kronman, Raisa Vasilievna: *See—*
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Kroth, Neil W., to Caterpillar Tractor Co. Fluid brake system for a vehicle. 4,076,323, Cl. 303-6.00R.

Kroth, Neil W., to Caterpillar Tractor Co. Brake system. 4,076,324, Cl. 303-6.00R.

Krusche, Alfred; and Drahtmuller, Hans Dieter, to Linde Aktiengesellschaft. Drive and steering arrangement for a vehicle with differential-speed steering. 4,076,090, Cl. 180-6.480.

Kubat, Josef; and Berggren, Kenneth S. Process for the preparation of a multilayer film. 4,076,568, Cl. 156-229.000.

Kubo, Teruo: *See—*
Yazawa, Masahide; Kubo, Teruo; and Suzuki, Kunio, 4,076,782, Cl. 264-51.000.

Kucera, Joseph Benedict, to Lowell, Rudolph L., a part interest. Large round bale handling apparatus. 4,076,137, Cl. 214-394.000.

Kuck, Kermit T.: *See—*
Gusching, Nagle V.; and Kuck, Kermit T., 4,075,753, Cl. 29-568.000.

Kuckenburg, Heinz: *See—*
Kolbeck, Rainer; Kuckenburg, Heinz; and Schaffernicht, Klaus, 4,076,995, Cl. 313-446.000.

Kuehnle, Manfred Rudolf: *See—*
Talmage, Peter Guy; and Kuehnle, Manfred Rudolf, 4,076,406, Cl. 355-10.000.

Kuhn, Ernst: *See—*
Landert, Heinrich; Radau, Wolfgang; and Kuhn, Ernst, 4,076,215, Cl. 254-93.00R.

Kumazawa, Eitaro: *See—*
Kai, Fumindo; Kumazawa, Eitaro; and Ishioka, Yozo, 4,075,767, Cl. 34-92.000.

Kunkle, John Philip: *See—*
Olsson, Billy Erik; and Kunkle, John Philip, 4,076,355, Cl. 339-17.00C.

Kuno, Tadashi; Abe, Akihiko; and Shoji, Akito, to Honda Giken Kogyo Kabushiki Kaisha. Prechamber mounting for internal combustion engine. 4,076,001, Cl. 123-191.00S.

Kunz, Walter: *See—*
Hubele, Adolf; Kunz, Walter; and Eckhardt, Wolfgang, 4,076,836, Cl. 424-285.000.

Kuo, Ted L. C., to Thomas & Betts Corporation. Wiring device. 4,076,364, Cl. 339-103.00R.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, 4,076,604, Cl. 204-98.000.
Sasaki, Tohru; Terasaki, Syuuzi; and Ichii, Takao, 4,076,889, Cl. 428-333.000.

Kuroda, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Method of forming electrode wirings in semiconductor devices. 4,076,860, Cl. 427-91.000.

Kuroda, Nobuyuki: *See—*
Matsuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Fumiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,076,923, Cl. 526-97.000.

Kutniewski, Donald F.: *See—*
Clayton, William J.; Olson, Robert H.; and Kutniewski, Donald F., 4,076,121, Cl. 206-390.000.

Kutsch, Howard James: *See—*
Anolick, Colin; and Kutsch, Howard James, 4,076,226, Cl. 267-139.000.

Kutzner, Willi Albert Peter; and Schneider, Georg, to Koenig & Bauer Aktiengesellschaft. Apparatus for trimming signatures. 4,076,231, Cl. 270-21.000.

Kuwakado, Satosi; Kasagi, Takao; and Takei, Toshihiro, to Nippon Soken, Inc.; and Arakawa Autobody Co., Ltd. Gas column type air bag system. 4,076,277, Cl. 280-738.000.

Kuwako, Takashi: *See—*
Kono, Tateomi; and Kuwako, Takashi, 4,076,410, Cl. 355-16.000.

Kvam, Donald C.: *See—*
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 4,076,519, Cl. 71-103.000.

L. E. Sauer Machine Company: *See—*
Sauer, Louis E., 4,075,918, Cl. 83-659.000.

Lachnit-Fixson, Ursula; and Neumann, Friedmund, to Schering Aktiengesellschaft. Novel agents and methods for treatment of climacteric disturbances. 4,076,811, Cl. 424-239.000.

Lacon, John W., to Fiberglas Canada Ltd. Apparatus for forming articles of fibrous materials. 4,076,479, Cl. 425-301.000.

L'Agence Nationale de Valorisation de la Recherech (ANVAR): *See—*
Lehn, Jean-Marie, 4,076,724, Cl. 260-338.000.

Lagodka, Gunter: *See—*
Elsner, Burckhardt; Lagodka, Gunter; Plevak, Lubomir; and Rosenberg, Harry, 4,075,857, Cl. 61-45.00D.

Lagow, Richard J., to Massachusetts Institute of Technology. Fluorinated functionalized polymers. 4,076,916, Cl. 526-43.000.

Laizerovich, David: *See—*
Avakian, Emik A.; and Laizerovich, David, 4,077,036, Cl. 340-365.00S.

Lamarque, Etienne: *See—*
Deffayet, Jean; and Lamarque, Etienne, 4,075,946, Cl. 102-52.000.

Lamb, Frank; Combey, Malcolm; and Cooper, Hugh Melvin, to Ciba-Geigy AG. Plasticized polymers of vinyl acetate. 4,076,678, Cl. 260-31.600.

Lampelzammer, Helga: *See—*
Huber, Peter; Lampelzammer, Helga; Pirson, Ewald; and Wimmer, Franz, 4,076,672, Cl. 260-29.20M.

Lancaster Research and Development Corporation: *See—*
Geschwender, Robert C., 4,076,880, Cl. 428-116.000.

Landau, Frederick W.: *See—*
Stewart, Thomas; and Landau, Frederick W., 4,076,950, Cl. 560-218.000.

Landert, Heinrich; Radau, Wolfgang; and Kuhn, Ernst, to Landert - Motoren A.G. Electrohydraulic drawing apparatus, particularly a hoist. 4,076,215, Cl. 254-93.00R.

Landert - Motoren A.G.: *See—*
Landert, Heinrich; Radau, Wolfgang; and Kuhn, Ernst, 4,076,215, Cl. 254-93.00R.

Landon, Richard D.: *See—*
Houx, James R., Jr.; Landon, Richard D.; and Lindahl, Paul A., Jr., 4,076,771, Cl. 261-159.000.

Landow Consulting Associates, Inc.: *See—*
Landow, Herbert T., 4,076,134, Cl. 214-38.00B.

Landow, Herbert T., to Landow Consulting Associates, Inc. Wheeled ramp loading and unloading apparatus. 4,076,134, Cl. 214-38.00B.

Landsinger, Edmund Emil; Chang, Richard Shih-Teng; and Gross, William Joseph, to Mattel, Inc. Toy simulating a calculator. 4,075,771, Cl. 35-31.00R.

Langley, Robert C.; and Abrash, Muriel, to Engelhard Minerals & Chemicals Corporation. Electrical circuit element comprising thick film resistor bonded to conductor. 4,076,894, Cl. 428-428.000.

LaRos Equipment Company, Inc.: *See—*
Rossio, John H., 4,076,478, Cl. 425-215.000.

Larsen, Peder, to Danfoss A/S. Cut-off valve for oil firing installations. 4,076,042, Cl. 137-494.000.

Larson, Milton I.: *See—*
Anderson, Walter J., 4,076,080, Cl. 172-804.000.

Larson, Scott E. Insulated bottle container having a bottle support as one part. 4,076,139, Cl. 215-11.00C.

Larsson, Hans Folke: *See—*
Archer, John Neville; and Larsson, Hans Folke, 4,076,068, Cl. 160-107.000.

Lasch, Frank J. System for rendering a moored hull self-bailing. 4,075,965, Cl. 114-49.000.

Latasiewicz, Leonard; and Stultz, Peter Franklin, to Motorola, Inc. Mounting arrangement for chassis and printed circuit board with method of assembly. 4,076,165, Cl. 228-136.000.

Latham, Raymond E. Fastener tensioning apparatus. 4,075,923, Cl. 85-1.00T.

Laundon, Brian, to Glaxo Laboratories Limited. 7β-(2-Aryl-2-hydroxyiminoacetamido)ceph-3-em-4-carboxylic acids carrying a 7α-lower alkoxy substituent. 4,076,936, Cl. 544-21.000.

Laurent, Gilbert: *See—*
Brossel, Maurice; Laurent, Gilbert; and Bertannier, Daniel, 4,076,885, Cl. 428-286.000.

Lausberg, Johannes Willebrordes; and Downton, Denys Edward, to Gibson Chemicals International Pty. Limited. Dishwashers and detergent dispensers. 4,076,146, Cl. 222-52.000.

Lawrence Peska Associates Inc.: *See—*
Sullivan, Dwayne, 4,076,305, Cl. 297-157.000.

Lawson, Nelson E., to Union Camp Corporation. Polyacrylate reaction products. 4,076,665, Cl. 260-22.0CB.

Lawyer, Russell R.: *See—*
Clay, Frank M.; Moran, Leland G.; and Lawyer, Russell R., 4,076,781, Cl. 264-40.700.

Lear Siegler, Inc.: *See—*
Chekirda, Russell F.; and Murphy, Randall T., 4,076,309, Cl. 297-363.000.

LeBegue, Maurice K., to National Mine Service Company. Continuous mining machine with laterally movable cutter drum member. 4,076,316, Cl. 299-64.000.

Lee, Robert W.; and Croat, John J., to General Motors Corporation. Method of making a laminated rare earth metal-cobalt permanent magnet body. 4,076,561, Cl. 148-103.000.

Lee, Ta-Jyh: *See—*
Smith, Robert L.; and Lee, Ta-Jyh, 4,076,942, Cl. 548-336.000.

Leeds & Northrup Company: *See—*
Connery, James Gerard; Muly, Emil Christopher; and Taylor, Robert Morgan, 4,076,596, Cl. 204-1.00T.

Lefebvre, Jean; and Pichouron, Jean-Claude, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Low-pressure diecasting machine. 4,076,070, Cl. 164-303.000.

Legoy, Auguste; and Legoy, Claude. Sealing device for rotary machines containing hydraulic fluid. 4,076,260, Cl. 277-25.000.

Legoy, Claude: *See*—
Legoy, Auguste; and Legoy, Claude, 4,076,260, Cl. 277-25.000.

Lehmann, Gunthart: *See*—
Kistner, Hermann; and Lehmann, Gunthart, 4,075,917, Cl. 83-422.000.
Kistner, Hermann; and Lehmann, Gunthart, 4,076,232, Cl. 270-54.000.

Lehn, Jean-Marie, to L'Agence Nationale de Valorisation de la Recherech (ANVAR). Polycyclic macrocyclic compounds. 4,076,724, Cl. 260-338.000.

Lehrach, Hans: *See*—
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.

Leiber, Heinz, to Robert Bosch GmbH. Detecting apparatus for a lock prevention system for detecting wear of vehicle brakes. 4,076,330, Cl. 303-92.000.

Leker, Richard E. Hydraulic transmission. 4,075,843, Cl. 60-487.000.

Leman, Arthur L. Stretch seal valve. 4,076,212, Cl. 251-332.000.

LeMay, Christopher Archibald Gordon, to EMI Limited. Computerized tomographic scanner with beam distribution control. 4,076,985, Cl. 250-445.00T.

Le Mehaute, Alain; and Bordet, Philippe, to Compagnie Generale d'Electricite S.A. Sodium-sulphur type electric cell. 4,076,900, Cl. 429-49.000.

Lemelson, Jerome H. Helmate. 4,075,717, Cl. 2-412.000.

Lemelson, Jerome H. Building insulation system and method. 4,075,799, Cl. 52-169.500.

Leo Pharmaceutical Products Ltd. A/S: *See*—
Tybring, Leif, 4,076,816, Cl. 424-251.000.

Leonov, Boris Ivanovich: *See*—
Gromov, Jury Vasilievich; Leonov, Boris Ivanovich; Smirnov, Oleg Petrovich; Smirnov, Nikolai Nikolaevich; Nagornaya, Ljudmila Lavrentievna; and Zakharin, Yakov Abramovich, 4,076,984, Cl. 250-367.000.

Lepicard, Georges: *See*—
Appell, Marc; Bienvenu, Jacques Michel Jean; Cassonnet, Jean-Claude Marcel; and Lepicard, Georges, 4,077,058, Cl. 364-200.000.

Lerich, Lester, to Wej-It Expansion Products, Inc. Spring action expansion bolt. 4,075,925, Cl. 85-64.000.

Lerner, Lewis Brian; and Davis, Thomas Francis, to AMP Incorporated. Method, electrolyte and additive for electroplating a cobalt brightened gold alloy. 4,076,598, Cl. 204-43.00G.

Les Fils d'Auguste Scheuchzer S.A.: *See*—
Buhler, Fritz, 4,075,888, Cl. 73-146.000.

Lester, David; and Alexander, Robert R., to Polymerics, Inc. Polymeric molding composition. 4,076,547, Cl. 106-109.000.

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Levenson, Harold S.: *See*—
Zeitlin, Benjamin R.; Pritchard, Alan B.; and Levenson, Harold S., 4,076,856, Cl. 426-594.000.

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Davies, Charles Bloor; Davies, James Francis; and Neillie, William Frederick Soutar, 4,076,653, Cl. 252-532.000.

Levine, Fred. Multi-use motor mount. 4,076,196, Cl. 248-14.000.

Levner, Mark H., to American Home Products Corporation. Process for enhancing the production of enterotoxin by *Vibrio cholerae*. 4,076,590, Cl. 195-96.000.

Levy, Jacques: *See*—
Bideau, Jean; Levy, Jacques; and Viaud, Jean-Luc, 4,076,586, Cl. 176-78.000.

Lewicki, Gregory David: *See*—
Lewicki, Stephen; Lewicki, Gregory David; and Lewicki, Stephen Jon, 4,076,872, Cl. 428-12.000.

Lewicki, Stephen; Lewicki, Gregory David; and Lewicki, Stephen Jon. Inflatable cellular assemblies of plastic material. 4,076,872, Cl. 428-12.000.

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Lewicki, Walter J., Jr.; and McQuate, William M., to Armstrong Cork Company. Multilevel embossing of foamed-sheet materials. 4,076,867, Cl. 427-264.000.

Lewis, Paul R., to Aluminum Company of America. Tear-off closure with entrapped pull-ring. 4,076,141, Cl. 215-254.000.

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Klank, Otto; and Rottmann, Dieter, 4,077,009, Cl. 325-455.000.
Kolbeck, Rainer; Kuckenburg, Heinz; and Schaffernicht, Klaus, 4,076,995, Cl. 313-446.000.

Lie, Bjorn: *See*—
Dorph, Thor, 4,076,185, Cl. 242-118.410.

Lie, Gina: *See*—
Dorph, Thor, 4,076,185, Cl. 242-118.410.

Lifshits, Viktor Senderovich; Sukhanov, Alexandr Alexandrovich; Dergachev, Nikolai Makarovich; Pevnev, Arkady Alexeevich; Baranov, Vladimir Nikitich; and Shklyanov, Leonid Pavlovich. Resistance type flash butt welder. 4,076,973, Cl. 219-97.000.

Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., to International Flavors & Fragrances Inc. Flavoring with substituted norbornane derivatives. 4,076,853, Cl. 426-538.000.

Light, Kenneth K.; Spencer, Bette M.; Vinals, Joaquin F.; Kiwala, Jacob; Vock, Manfred Hugo; and Shuster, Edward J., to International Flavors & Fragrances Inc. Flavoring with a cyclohexadiene derivative. 4,076,854, Cl. 426-538.000.

Lill, Deryl L. Metric system teaching and measuring device. 4,075,770, Cl. 35-30.000.

Lind, Evald Torbjorn Gustav. Method of embodying a foil sheet in a thermoplastic object during the process of manufacturing said object. 4,076,790, Cl. 264-266.000.

Lind, Thomas Peter, to Singer Company, The. Apparatus for rapidly determining the trigonometric functions of an input angle. 4,077,063, Cl. 364-729.000.

Lindahl, Paul A., Jr.: *See*—
Houx, James R., Jr.; Landon, Richard D.; and Lindahl, Paul A., Jr., 4,076,771, Cl. 261-159.000.

Lindberg, Per Lennart: *See*—
Carlsson, Per Arvid Emil; Lindberg, Per Lennart; and Wickberg, Borje Vilhelm, 4,076,840, Cl. 424-324.000.

Linde Aktiengesellschaft: *See*—
Krusche, Alfred; and Drahtmuller, Hans Dieter, 4,076,090, Cl. 180-6.480.

Linder, Ernst; Wossner, Gunter; Maurer, Helmut; and Rieger, Franz, to Robert Bosch GmbH. Method and apparatus for reducing the toxic components in exhaust gas. 4,075,992, Cl. 123-119.00A.

Linder, Rolf. Method and an electrically heated device for producing molten metal from powders or lumps of metal oxides. 4,076,954, Cl. 13-9.00R.

Lindstaedt, Robert F. Conduit reamer. 4,076,446, Cl. 408-227.000.

Lindstrom, Kurt Olle Ragnvald: *See*—
Thyberger, Filip Bertil; and Lindstrom, Kurt Olle Ragnvald, 4,075,861, Cl. 61-105.000.

Lindstrom, Olle B., to AB Olle Lindstrom. Alkaline lead battery. 4,076,909, Cl. 429-207.000.

Linebaugh, David T. Marionette actuation. 4,075,780, Cl. 46-13.000.

Lippsmeier, Bernd; and Hestermann, Klaus, to Hoechst Aktiengesellschaft. Production of hydroxyalkylphosphine oxides. 4,076,755, Cl. 260-606.50P.

Lipscomb, Willis Leonard. Articulated skateboard. 4,076,267, Cl. 280-87.04A.

Lisnay, Albert D., to Heinemann Electric Company. Multi-pole circuit breaker. 4,077,024, Cl. 335-8.000.

Little, Clayton D.; and Machmeier, Paul M., to General Dynamics Corporation. High strength fracture resistant weldable steels. 4,076,525, Cl. 75-128.00B.

Littlefield, Herrick B., to Polyproducts Corporation. Combined sealing and pouring spout assembly. 4,076,151, Cl. 222-525.000.

Litz, Donald C., to Westinghouse Electric Corporation. Superconducting dynamoelectric machine having a liquid metal shield. 4,076,988, Cl. 310-52.000.

Liu, Wai-Min: *See*—
Bennett, Harold F.; and Liu, Wai-Min, 4,076,388, Cl. 350-187.000.

Liu, William Y. Food shredding and dicing machine. 4,076,180, Cl. 241-154.000.

Lodewyk, Eric, to Syntex (U.S.A.) Inc. Process for calcium salts α-ketocarboxylic acids. 4,076,745, Cl. 260-526.00R.

Logerot, Bernard Andre: *See*—
Pechard, Lucien Leon; and Logerot, Bernard Andre, 4,076,363, Cl. 339-91.00R.

Lois, Lambros. Apparatus for extracting energy from winds at significant height above the surface. 4,076,190, Cl. 244-153.00R.

Lord, John G.: *See*—
Carver, Herbert K., Jr.; Chant, Albert H.; Hall, James F.; Hansen, Omar, Jr.; and Lord, John G., 4,075,815, Cl. 53-32.000.

L'Oreal: *See*—
Papantoniou, Christos; and Grognet, Jean-Claude, 4,076,912, Cl. 526-16.000.

Lorenz, Erika, heiress: *See*—
Lorenz, Walter, deceased; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,076,806, Cl. 424-200.000.

Lorenz, Leo J.; and Stanek, Gary C., to Massey-Ferguson Inc. Grille mounting apparatus. 4,076,092, Cl. 180-68.00P.

Lorenz, Walter; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. O,S-Dialkyl-O-(N-methoxy-benzimidoyl)-thionothiol phosphoric acid esters and arthropodicidal use. 4,076,808, Cl. 424-211.000.

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Loschilin, Evgeny Dmitrievich: *See*—
Zabotin, Alexandr Alexandrovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Galperin, Alexandr Lvovich; Santucci, Nicola; and Corain, Luciano, 4,076,051, Cl. 139-436.000.

Lovick, James S. Veterinary appliance. 4,076,020, Cl. 128-98.000.

Lowell, Rudolph L.: *See*—
Kucera, Joseph Benedict, 4,076,137, Cl. 214-394.000.

Lubarsky, Andre, Jr.; Warner, G. Scott; and Tahara, Goro R., to Telecommunications Technology, Inc. Switching system having a central controller for accessing individual telephone circuits for testing. 4,076,970, Cl. 179-175.20R.

Lucas Electrical Co., Limited: *See*—
Hill, William Frank, 4,075,997, Cl. 123-148.00E.

Lucas, Gary M.: *See*—
Schroeter, Siegfried H.; Bolon, Donald A.; and Lucas, Gary M., 4,076,489, Cl. 431-94.000.

Lui, Albert S.; and Arbab, Majid, to NCR Corporation. Error checking and correcting device. 4,077,028, Cl. 340-146.1AL.

Lumbis, Anthony W.: *See*—
Banker, William W.; and Lumbis, Anthony W., 4,076,322, Cl. 303-1.000.

Lurssen, Klaus: *See*—
Naumann, Klaus; Sasse, Klaus; and Lurssen, Klaus, 4,076,517, Cl. 71-86.000.

Maass, Alfred Roland, to SmithKline Corporation. Uricosuric composition and method of producing uricosuria and hypouricemia. 4,076,839, Cl. 424-317.000.

Mabry, Patricia D. Needlework technique using ribbon. 4,075,962, Cl. 112-439.000.

Machmeier, Paul M.: *See*—
Little, Clayton D.; and Machmeier, Paul M., 4,076,525, Cl. 75-128.00B.

MacIntosh, Frank W., to Gas-Fired Products, Inc. Apparatus for loading tobacco in barns. 4,076,059, Cl. 141-390.000.

Mackie, Gordon John: *See*—
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Macmillan, Kenneth T. Retread mold with locking means. 4,076,473, Cl. 425-19.000.

Macnab, Ian: *See*—
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, 4,076,884, Cl. 428-255.000.

Madsen, Trygve T.: *See*—
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Maeda, Keisuke: *See*—
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Maehara, Naoyoshi; Fujieda, Hiroshi; and Saka, Tatsuo, to Matsushita Electric Industrial Co., Ltd. Power supplier for magnetron. 4,076,996, Cl. 315-106.000.

Maffrand, Jean-Pierre, to Parcor. Thieno-pyridine derivatives and therapeutic composition containing same. 4,076,819, Cl. 424-256.000.

Magdefrau, Herbert: *See*—
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.

Mages, Bernhard: *See*—
Rock, Erich; and Mages, Bernhard, 4,075,735, Cl. 16-145.000.

Mahl, Harry L., Jr.; and Clark, Franklin D., to W. R. Grace & Co. Process for prilling ammonium nitrate. 4,076,773, Cl. 264-3.00E.

Makowski, Mieczyslaw Paul: *See*—
Subramanyan, Palliyil K.; Makowski, Mieczyslaw Paul; and Setele, Robert Joseph, 4,076,597, Cl. 204-13.000.

Malkani, Dalip T.: *See*—
Hague, David P.; Malkani, Dalip T.; Middlemiss, Andrew; and Scholey, Stuart, 4,075,747, Cl. 29-18.000.

Malm, Hans R.; Nilsson, Peter J.; and Konicek, Jiri K., to Perstorp AB. Process in the production of a multilayer printed board. 4,075,757, Cl. 29-625.000.

Mamatsashvili, Georgy Viktorovich: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

Manea, Antonio, to F.lli Manea S.n.c. Costruzioni Meccaniche Accessori Tessili. Machine for the formation of selvedges in fabrics. 4,076,049, Cl. 139-434.000.

Manetti, Orlando, to Sigismondo Piva S.p.A. Automatic apparatus for obtaining ring-shaped articles from an elongated plait or strip of textile material. 4,075,956, Cl. 112-121.270.

MAPAL Fabrik fur Prazisionswerkzeuge Dr. Kress KG: *See*—
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Mar, John; Garrett, Todd; and Jacques, Petrus, to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Sonobuoy casing. 4,075,725, Cl. 9-8.00R.

Marano, John Francis, to Kotten Machine Co. of Calif. Inc. Mandrel design for bagel making machine. 4,076,480, Cl. 425-364.00B.

Marcaccioli, Enzo: *See*—
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Marforio, Nerino, to Rockwell-Rimoldi S.p.A. Workpiece guide for sewing machines. 4,075,957, Cl. 112-153.000.

Marger, Jerome S.: *See*—
Pike, Allan R., 4,076,230, Cl. 269-328.000.

Mark, John Thomas, to RCA Corporation. Vacuum tube grid structures of phosmic bronze having copper and copper alloy conical supports. 4,076,992, Cl. 313-296.000.

Marks, Bruce George: *See*—
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Marley Cooling Tower Company, The: *See*—
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Marseillan, Jorge. Panel forms having panel reinforcing means. 4,076,206, Cl. 249-44.000.

Marsh, Robert Anthony; Mackie, Gordon John; and Hale, Peter, to Procter & Gamble Company, The. Protein-containing detergent compositions for protecting keratinous materials. 4,076,800, Cl. 424-70.000.

Marshall, Hamilton W., Jr.: *See*—
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Marshavina, Natalya Lvovna: *See*—
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Marta, Henry A.; Mels, Kenneth D.; Garg, Vijay K.; and Miller, Albert J., to General Motors Corporation. Railway locomotive truck with resilient suspension. 4,075,950, Cl. 105-197.00A.

Martin, James C.: *See*—
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Martin, Jerry D.: *See*—
Cammarata, Frank, III; Miller, Joe Alan; and Martin, Jerry D., 4,076,063, Cl. 150-.500.

Martin Marietta Corporation: *See*—
Meszaros, Laszlo A., 4,076,498, Cl. 8-41.00C.

Martinek, Thomas W., to Teepak, Inc. Method and apparatus for making end closures for shirred casing sticks. 4,075,938, Cl. 9.3-84.0TW.

Martinez, Felix Jesus, to Erika, Inc. Resealable device for repeated access to conduit lumens. 4,076,023, Cl. 128-214.00R.

Martinez, Felix Jesus, to Erika, Inc. Laminar flow connector for conduits. 4,076,285, Cl. 285-332.000.

Marttala, Lauri Tapani, to A. Ahlstrom Osakeyhtio. Method and apparatus for the evaporation of liquids. 4,076,576, Cl. 159-13.00B.

Marvin Glass & Associates: *See*—
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Marvin, Larry E.: *See*—
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Mas, Louis, to Societe de Recherches Techniques et Industrielles. Electrolysis apparatus. 4,076,609, Cl. 204-258.000.

Maschinenbau Oppenweiler GmbH: *See*—
Kistner, Hermann; and Lehmann, Gunthart, 4,075,917, Cl. 83-422.000.
Kistner, Hermann; and Lehmann, Gunthart, 4,076,232, Cl. 270-54.000.

Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
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Masonite Corporation: *See*—
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Massachusetts Institute of Technology: *See*—
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Massey-Ferguson Inc.: *See*—
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Mastrangelo, Sebastian V. R.: *See*—
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Mastronuzzi, Carl T., Jr.: *See*—
Hill, Richard D., II; and Mastronuzzi, Carl T., Jr., 4,075,781, Cl. 46-74.00D.

Masuda, Fusayoshi; Nishida, Kazuo; and Nakamura, Akira, to Sanyo Chemical Industries, Ltd. Water absorbing starch resins. 4,076,663, Cl. 260-17.4GC.

Masuda, Jun: *See*—
Satoh, Akihiro; Takahashi, Akio; Masuda, Jun; Harada, Masato; and Yamada, Sadahiko, 4,076,922, Cl. 526-97.000.

Masuda, Takao: *See*—
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Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; Sashihara, Kenji; and Masuda, Takao, 4,076,534, Cl. 96-63.000.

Matejcek, Klaus: *See*—
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Mateos, Jose Luis; Noriega, Luis; Huettemann, Richard E.; and Kanojia, Ramesh M., to Ortho Pharmaceutical Corporation. Uteroevacuant extracts from plant substances. 4,076,805, Cl. 424-195.000.

Mathis, Joseph Richard, to International Business Machines Corporation. Uncertain interval timer using a variable length shift register. 4,077,011, Cl. 328-129.000.

Matsuda, Ken; and Tsu, Kin Hsueh-Yuan, to American Cyanamid Company. Process for hydration of acrylonitrile to produce acrylamide. 4,076,747, Cl. 260-561.00N.

Matsui, Sadayoshi: *See*—
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Matsumoto, Kazuo: *See—*
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Matsuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Fumiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, to Nippon Oil Company, Limited. Process for preparing polyolefins. 4,076,923, Cl. 526-97.000.
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Mattson, John P. Solar energy collector. 4,076,015, Cl. 126-271.000.
Maulding, Donald Roy, to American Cyanamid Company. Process for manufacturing crystal violet lactone. 4,076,728, Cl. 260-343.400.
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Max Co., Ltd.: *See—*
Nakazato, Takashi; Sawada, Chikamitsu; Umino, Shigeyuki; and Takatsuru, Mitsuhiro, 4,075,850, Cl. 60-633.000.
Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
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De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.
May, John Walter: *See—*
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Mayer, Edward A.; and Plungis, Donald W., to Texaco Inc. Internal combustion engine operation utilizing exhaust gas recirculation. 4,075,994, Cl. 123-119.00A.
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Barannik, Ivan Andreevich; Kachurka, Alexandr Nikolaevich; Zharovsky, Ivan Vasilievich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; and Mazurkevich, Alexandr Borisovich, 4,076,472, Cl. 425-8.000.
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Mazzolla, Richard, to H & G Industries, Inc. Positive cam lock for extension pole. 4,076,437, Cl. 403-350.000.
McCloskey, Albert R., to Heim Universal Inc. Spherical bearing assembly with insert member. 4,076,343, Cl. 308-72.000.
McClure, Troy A. Rotary engine with separable abutment and adjustable valve cam. 4,076,471, Cl. 418-143.000.
McConnell, Kennedy, to Interlake, Inc. Shim for rack column. 4,076,202, Cl. 248-188.200.
McCracken, Stephen R.: *See—*
Heller, Robert I.; Schafer, Larry C.; and McCracken, Stephen R., 4,077,038, Cl. 343-7.00A.
McDonald, Harold, to Stauffer Chemical Company. Catalyst system for flame retardant finishing. 4,076,650, Cl. 252-440.000.
McDonnell, Thomas M. Wall shelf arrangement. 4,076,203, Cl. 248-247.000.
McFarland, Paula M. Device for handling cake layers. 4,076,297, Cl. 294-7.000.
McGann, Rodney, to Texaco Inc. Process for production of purified and humidified fuel gas. 4,075,831, Cl. 60-39.050.
McKenna, David: *See—*
Hopkins, Joseph; and McKenna, David, 4,076,983, Cl. 250-341.000.
McKinney, Robert D., to Raymond Lee Organization, Inc., The. Radio mounted in a helmet. 4,077,007, Cl. 325-315.000.
McLaughlin, William A.: *See—*
Drinkard, Gary; and McLaughlin, William A., 4,076,078, Cl. 166-271.000.
McMahan, Roy F., Jr.: *See—*
McMahan, Roy F., Sr., 4,076,346, Cl. 308-237.00R.
McMahan, Roy F., Sr., to McMahan, Roy F., Jr.; and McMahan, William L. Face-to-face plate-type swivel. 4,076,346, Cl. 308-237.00R.
McMahan, William L.: *See—*
McMahan, Roy F., Sr., 4,076,346, Cl. 308-237.00R.
McQuate, William M.: *See—*
Lewicki, Walter J., Jr.; and McQuate, William M., 4,076,867, Cl. 427-264.000.
McSherry, Thomas W.; and Thaw, Allan, to Mechanical Plastics Corporation. Anchor assembly for fastener. 4,075,924, Cl. 85-3.00R.
McVey, Charles I., to General Electric Company. Nb or Ta coated with fired Zr-Mo for metal-ceramic seals. 4,076,898, Cl. 428-553.000.
Mechanical Plastics Corporation: *See—*
McSherry, Thomas W.; and Thaw, Allan, 4,075,924, Cl. 85-3.00R.
Medenus, Bernhard: *See—*
Mettig, Hermann; and Medenus, Bernhard, 4,075,991, Cl. 123-119.0CD.
Medley, Ronald D.; and Chapman, James R., to Cosden Technology, Inc. Process for the production of a multiple layer laminate. 4,076,570, Cl. 156-244.000.
Meek, Lennis E., to Dayco Corporation. Antifriction nylon member. 4,076,347, Cl. 308-238.000.
Meeker, John G. Fireplace grate. 4,076,012, Cl. 126-164.000.
Mehta, Shashi Pal: *See—*
Singiser, Robert E.; Chun, Alexander Hing Chinn; and Mehta, Shashi Pal, 4,076,804, Cl. 424-181.000.
Meier, Joseph F.; and Smith, James D. B., to Union Carbide Corporation. High strength cast modules for supporting reverse osmosis membranes. 4,076,626, Cl. 210-496.000.
Meiji Seika Kaisha, Ltd.: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.
Meinke, Peter; and Huber, Wolfgang, to SKF Kugessagerfabriken GmbH; and Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Drive and bearing support for a disc-shaped rotor. 4,076,340, Cl. 308-10.000.
Meissner, Helmuth E.: *See—*
Foster, Gordon F.; Meissner, Helmuth E.; and Stiles, Janice L., 4,076,792, Cl. 423-213.500.
Meldner, Volker Otto, to Wayss & Freytag Aktiengesellschaft. Tunnel construction and tunnel tubbing. 4,075,855, Cl. 61-45.00R.
Mellgren, Per Gustaf: *See—*
Karrer, Friedrich Wilhelm Johann; and Mellgren, Per Gustaf, 4,075,765, Cl. 34-20.000.
Mellor, James Robert; and Billington, Colin, to Pilkington Brothers Limited. Controlled method for the production of clad glass rod. 4,076,512, Cl. 65-29.000.
Meliqvist, Allan; and Anderberg, Thorild Nils Kristian Ewald. Apparatus for the supply of liquids in finely-divided form to an internal combustion engine. 4,076,002, Cl. 123-198.00A.
Mels, Kenneth D.: *See—*
Marta, Henry A.; Mels, Kenneth D.; Garg, Vijay K.; and Miller, Albert J., 4,075,950, Cl. 105-197.00A.
Mendel, Arthur: *See—*
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 4,076,519, Cl. 71-103.000.
Meng, Karl: *See—*
Horstmann, Harald; Meng, Karl; and Wehinger, Egbert, 4,076,943, Cl. 548-360.000.
Merck & Co., Inc.: *See—*
Anderson, Paul S.; and Remy, David C., 4,076,714, Cl. 424-267.000.
Christensen, Burton A.; Morin, Robert B.; and Walton, Edward, 4,076,826, Cl. 424-272.000.
Smith, Robert L.; and Lee, Ta-Jyh, 4,076,942, Cl. 548-336.000.
Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Bernhard, Horst; and Esselborn, Reiner, 4,076,551, Cl. 106-291.000.
Merck Sharp & Dohme (I.A.) Corporation: *See—*
Belanger, Patrice C., 4,076,939, Cl. 544-134.000.
Merianos, John J.: *See—*
Kaplan, Saul; Merianos, John J.; Green, Harold A.; and Petrocci, Alfonso N., 4,076,744, Cl. 260-501.190.
Merisio, Alberto, to Somet Societa' Meccanica Tessile S.p.A. Weft presenting device for looms with selective weft feed. 4,076,054, Cl. 139-453.000.
Merten, Rudolf: *See—*
Zecher, Wilfried; Clarenz, Werner; and Merten, Rudolf, 4,076,694, Cl. 260-77.5MA.
Messerschmitt-Bolkow-Blohm GmbH: *See—*
Baum, Werner; and Munding, German, 4,076,082, Cl. 175-14.000.
Messner, John David: *See—*
Gross, Harvey Andrew; Frey, Harry Robert; Messner, John David; and Walters, Raymond Frederick, 4,076,426, Cl. 356-239.000.
Meszaros, Laszlo A., to Martin Marietta Corporation. Dyed polyethylene terephthalate textile fibers with greenish blue shade. 4,076,498, Cl. 8-41.00C.
Metacon AG: *See—*
Tinnes, Bernhard, 4,076,153, Cl. 222-600.000.
Tinnes, Bernhard, 4,076,154, Cl. 222-600.000.
Metall-Invent S.A.: *See—*
Kreidler, Alfred, 4,075,881, Cl. 72-270.000.
Metallgesellschaft Aktiengesellschaft: *See—*
Reh, Lothar; Schmidt, Hans-Werner; and Plass, Ludolf, 4,076,796, Cl. 423-659.000.
Schindling, Josef Franz, 4,076,044, Cl. 137-614.110.
Metco, Inc.: *See—*
Dittrich, Ferdinand J.; and Weir, John D., 4,076,883, Cl. 428-242.000.
Mettig, Hermann; and Medenus, Bernhard, to Klockner-Humboldt-Deutz Aktiengesellschaft. Supercharged water cooled internal combustion engine. 4,075,991, Cl. 123-119.0CD.
Metz, Pierre, to Thomson-Brandt. Attitude-controlling system and a missile equipped with such a system. 4,076,187, Cl. 244-3.230.
Meyer, Leonard S. Target particularly for archery. 4,076,246, Cl. 273-102.00B.
Meyer, Willy: *See—*
Bohner, Beat; Dawes, Dag; and Meyer, Willy, 4,076,938, Cl. 544-132.000.

Meystre, Charles: *See—*
Anner, Georg; and Meystre, Charles, 4,076,737, Cl. 260-397.450.

Mezzino, Joseph F.: *See—*
Ryder, William S.; and Mezzino, Joseph F., 4,076,855, Cl. 426-594.000.

Michaels, William A.: *See—*
Tauschek, Max J.; and Michaels, William A., 4,075,987, Cl. 123-90.300.

Michel, Basil J.; Morse, Gary P.; and Wilcox, Alfred L., to General Signal Corporation. Apparatus for the treatment of divided solid material. 4,075,766, Cl. 34-57.00D.

Michel, Rupprecht, to Kraftwerk Union Aktiengesellschaft. Assembly of a combustion chamber nose in a continuous-flow boiler having a two-section construction with gas-tightly welded walls. 4,075,979, Cl. 122-235.00A.

Middlemiss, Andrew: *See—*
Hague, David P.; Malkani, Dalip T.; Middlemiss, Andrew; and Scholey, Stuart, 4,075,747, Cl. 29-18.000.

Midrex Corporation: *See—*
Pietsch, Wolfgang B., 4,076,520, Cl. 75-5.000.

Mikofalvy, Bela Kalman; and Doyle, Thomas Joseph, to B. F. Goodrich Company, The. Process for producing homo- or copolymerization of vinyl or vinylidene halides having reduced polymer build-up in the reactor. 4,076,920, Cl. 526-74.000.

Milach, Adam Arsentievich: *See—*
Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.

Milberger, Ernest C.: *See—*
Dolhyj, Serge R.; Milberger, Ernest C.; and White, James F., 4,076,731, Cl. 260-346.400.

Miles Laboratories, Inc.: *See—*
Dugle, James B.; and Hager, C. Bradley, 4,076,502, Cl. 23-230.00R.

Miller, Albert J.: *See—*
Marta, Henry A.; Mels, Kenneth D.; Garg, Vijay K.; and Miller, Albert J., 4,075,950, Cl. 105-197.00A.

Miller, Joe Alan: *See—*
Cammarata, Frank, III; Miller, Joe Alan; and Martin, Jerry D., 4,076,063, Cl. 150-.500.

Millett, Dennis A., to Garrett Corporation, The. Pneumatic actuator system and method. 4,075,930, Cl. 91-361.000.

Millick, William H., III, to Hercofina. Hydrogenation of molten aldehydic dimethyl terephthalate. 4,076,946, Cl. 560-78.000.

Mills, Gordon D., to Olin Corporation. Method for controlling oxygen level during continuous xanthation of alkali cellulose. 4,076,934, Cl. 536-60.000.

Mills, Kenneth R., to Phillips Petroleum Company. Ultraviolet light stabilizer combination for polymers. 4,076,689, Cl. 260-45.75W.

Milner, David Lee; and Ripley, Ian Stanley, to Imperial Chemical Industries Limited. Polymerization catalyst comprising aluminum halide and an alcohol or ether. 4,076,926, Cl. 526-209.000.

Mims, Samuel S., to El Paso Products Company. Process for treatment of adipic acid mother liquor. 4,076,948, Cl. 560-191.000.

Minami, Hidehiro: *See—*
Saito, Masaaki; and Minami, Hidehiro, 4,075,834, Cl. 60-276.000.

Mincer, Joseph L.: *See—*
Gibson, Harry W.; Bailey, Frank C.; and Mincer, Joseph L., 4,076,893, Cl. 428-407.000.

Minnesota Mining and Manufacturing Company: *See—*
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 4,076,519, Cl. 71-103.000.
Kalka, James C., 4,076,204, Cl. 248-500.000.

Minolta Camera Kabushiki Kaisha: *See—*
Hamaguchi, Hiroshi; and Miyata, Shin, 4,076,409, Cl. 355-16.000.
Imura, Toshinori, 4,077,041, Cl. 354-21.000.
Imura, Toshinori; Maeda, Keisuke; and Naya, Mikio, 4,077,042, Cl. 354-21.000.
Kono, Tateomi; and Kuwako, Takashi, 4,076,410, Cl. 355-16.000.
Nanba, Yasuhiro, 4,077,043, Cl. 354-51.000.

Minovitch, Michael A. Rapid transit system. 4,075,948, Cl. 104-138.00R.

Misercola, Douglas, to Empire Brushes, Inc. Vented hair brush. 4,076,032, Cl. 132-9.000.

Mista, Kresimir; and Gerstner-Stevens, Ditmar, to Karl Mayer Textilmaschinenfabrik GmbH. Thread testing apparatus for textile machines. 4,075,744, Cl. 28-224.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Yamanaka, Akira, 4,076,300, Cl. 296-35.00R.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Iwasaki, Takeshi; Fujikawa, Yasuo; and Sasaki, Kunimasa, 4,075,890, Cl. 73-295.000.

Mitsubishi Petrochemical Co., Ltd.: *See—*
Samejima, Hiroshi, 4,076,767, Cl. 260-862.000.

Mitsui Petrochemical Industries Ltd.: *See—*
Toyota, Akinori; Odawara, Kiyoshi; and Kashiwa, Norio, 4,076,924, Cl. 526-125.000.

Miyamoto, Akio: *See—*
Tsuji, Nobuo; Ishige, Sadao; Miyamoto, Akio; and Kato, Hajime, 4,076,887, Cl. 428-307.000.

Miyata, Shin: *See—*
Hamaguchi, Hiroshi; and Miyata, Shin, 4,076,409, Cl. 355-16.000.

Miyoshi, Mituji: *See—*
Matsuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Fumiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,076,923, Cl. 526-97.000.

Mizoguchi, Hiroshi: *See—*
Wada, Masamichi; Nakagawa, Isamu; and Mizoguchi, Hiroshi, 4,076,354, Cl. 316-1.000.

Mizumoto, Yasuhiro: *See—*
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.

Mizuno, Akira, to Goshi Kaisha Mizuno Kogeisha. Braking control apparatus for a vehicle. 4,076,093, Cl. 180-82.00R.

Mobil Oil Corporation: *See—*
Bridger, Robert F.; and Cier, Ronald J., 4,076,639, Cl. 252-47.500.
Chang, Clarence D.; and Silvestri, Anthony J., 4,076,761, Cl. 260-668.00R.
Clayton, William J.; Olson, Robert H.; and Kutniewski, Donald F., 4,076,121, Cl. 206-390.000.
Dessau, Ralph M., 4,076,505, Cl. 44-1.00R.
Finberg, Arne O., 4,076,655, Cl. 260-2.5HB.
Nnadi, John C., 4,076,636, Cl. 252-25.000.
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,076,842, Cl. 423-328.000.

Mochizuki, Yoshifumi: *See—*
Yoshida, Makoto; Mochizuki, Yoshifumi; Yamauchi, Masamichi; and Kawashima, Hideyuki, 4,075,827, Cl. 58-23.0AC.

Moczygemba, George A.; and Hsieh, Henry L., to Phillips Petroleum Company. Treatment of coupled polymers prior to hydrogenation. 4,076,914, Cl. 526-25.000.

Mogilevsky, Evsei Moiseevich. Method for washing continuously moving yarn. 4,076,499, Cl. 8-137.500.

Mogler, Philip D.: *See—*
Alper, Marc H.; and Koestering, Ernest J., 4,075,801, Cl. 52-196.000.

Mohnach, Michael G.: *See—*
Harbison, William H.; Mohnach, Michael G.; and Plisky, John J., 4,075,731, Cl. 15-250.420.

Mohr, Walter, to Braun Aktiengesellschaft. Lighter with swingable actuator. 4,076,491, Cl. 431-130.000.

Molay, Ira, to Audiophonics Corporation. Portable sound device for public address. 4,076,957, Cl. 179-1.0AT.

Molick, Medea. Foundation aquaduct and expansion joint. 4,075,800, Cl. 52-169.500.

Molins Limited: *See—*
Daisley, Robert Thomas; and Chumley, David Charles Philip, 4,076,115, Cl. 198-487.000.
Penzias, Rolf, 4,075,937, Cl. 93-77.0FT.

Monarch Machine Tool Company, The: *See—*
Gusching, Nagle V.; and Kuck, Kermit T., 4,075,753, Cl. 29-568.000.

Monroe Auto Equipment Company: *See—*
Wijnhoven, Jan M. A.; Oancea, Alexandru; Vanhove, Henri C. J.; and Beets, Roland H. C., 4,076,276, Cl. 280-714.000.

Monroe, Benjamin F. Racing game and game piece. 4,076,245, Cl. 273-86.00C.

Monsanto Company: *See—*
Herber, John F.; Richard, William R., Jr.; and Street, Robert W., 4,076,642, Cl. 252-78.500.
Owsley, Dennis C.; and Bloomfield, Jordan J., 4,076,758, Cl. 260-618.00R.
White, Donald A., 4,076,601, Cl. 204-59.00R.

Monsanto Research Corporation: *See—*
Opferkuch, Robert E., Jr.; and Wong-Chong, George M., 4,076,620, Cl. 210-45.000.

Montagu, Jean I., to General Scanning, Inc. Oscillation motor. 4,076,998, Cl. 318-132.000.

Montclair Research Corporation: *See—*
Grossman, Harold, 4,076,031, Cl. 131-261.00A.

Montedison S.p.A.: *See—*
Perugini, Giancarlo; and Marcaccioli, Enzo, 4,076,888, Cl. 428-313.000.

Moody, Harold W., Jr.; Bulkley, Clifford T.; Gagnon, Joseph A. L. N.; and Fraser, Grover, to Dunham-Bush, Inc. Feedback control system for helical screw rotary compressors. 4,076,461, Cl. 417-310.000.

Moody, Warren L.; and Baugh, Edward D., to General Motors Corporation. Vehicle engine speed control system. 4,076,094, Cl. 180-108.000.

Mookherjee, Braja Dulal: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.

Moore, Travis; and Niblock, Hugh David, to Uniroyal Limited. Golf balls. 4,076,255, Cl. 273-226.000.

Moore, William G., to Dow Chemical Company, The. Calcium chloride prilling. 4,076,776, Cl. 264-13.000.

Moraly, Alain: *See—*
Trinh, Stephane; Moraly, Alain; and Gaulliard, Jean-Michel, 4,076,807, Cl. 424-209.000.

Moran, Leland G.: *See—*
Clay, Frank M.; Moran, Leland G.; and Lawyer, Russell R., 4,076,781, Cl. 264-40.700.

Moraschetti, Nando, to Volpi AG. Fiber-optic device with curved sleeve and filler matrix. 4,076,377, Cl. 350-96.250.

Moretti, Anthony L., to E. D. Bullard Company. Method of and means for shielding the lens of a face mask. 4,076,373, Cl. 350-61.000.

Morez, Gene S.; and Griffin, James F., to Norlin Music, Incorporated.

Audio power amplifier with automatic bias control. 4,077,013, Cl. 330-267.000.

Morgan, John Henry, to John Morgan Printing Machinery Ltd. Apparatus for reeling web- or strand-like material. 4,076,184, Cl. 242-75.300.

Mori, Yasuki: *See—*
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Morikawa, Tadayuki: *See—*
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Morin, Robert B.: *See—*
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Morio, Minoru, to Sony Corporation. System for recording and/or reproducing a video signal. 4,077,046, Cl. 358-4.000.

Morishita, Michio: *See—*
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Morita, Takayuki: *See—*
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Morse, Gary P.: *See—*
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Moser, Dick: *See—*
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Moss, Donald H.: *See—*
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Motor Wheel Corporation: *See—*
Hubbard, Harold C., 4,076,327, Cl. 303-20.000.

Motorola, Inc.: *See—*
Carson, Lansing McClain; and Welter, Neil Evan, 4,077,015, Cl. 331-4.000.
Davidson, John Richard, 4,076,997, Cl. 315-209.00T.
Greeson, Richard L.; and Philofsky, Elliott M., 4,077,045, Cl. 357-71.000.
Latasiewicz, Leonard; and Stultz, Peter Franklin, 4,076,165, Cl. 228-136.000.
Ryon, Donald Carroll, 4,077,010, Cl. 328-20.000.

Moyer, Norman E., to Hughes Aircraft Company. Timing circuit for digital wristwatch. 4,075,826, Cl. 58-23.00R.

Mracek, Jaroslav; and Paek, Un-Chul, to Western Electric Co., Inc. Methods and apparatus for coating a filament. 4,076,510, Cl. 65-3.00A.

MTM Molded Products Co.: *See—*
Huelskamp, Urban A., 4,076,004, Cl. 124-5.000.

Mueller, James P.: *See—*
Johnson, David G.; and Mueller, James P., 4,076,329, Cl. 303-56.000.

Mueller, Larry G.: *See—*
Wagner, Eugene R.; and Mueller, Larry G., 4,076,841, Cl. 424-324.000.

Muguruma, Yoshikata, to Shinpo Kogyo Kabushiki Kaisha. Swing-drive-vehicle. 4,076,269, Cl. 280-218.000.

Mukaemachi, Takuji; and Fukushima, Yutaka, to Hitachi, Ltd. Subscriber line testing system. 4,076,971, Cl. 179-175.30R.

Mulders, Julien: *See—*
Brahm, Jacques; and Mulders, Julien, 4,076,643, Cl. 252-89.00R.

Muller, Walter: *See—*
Eichenseer, Franz; Steidl, Dieter; and Muller, Walter, 4,076,935, Cl. 536-86.000.

Mulvaney, James E.; and Rupp, Raymond W., to Sherwin-Williams Company, The. Photoconductive N-vinyl carbazole copolymers and process for preparing same. 4,076,526, Cl. 96-1.50R.

Muly, Emil Christopher: *See—*
Connery, James Gerard; Muly, Emil Christopher; and Taylor, Robert Morgan, 4,076,596, Cl. 204-1.00T.

Mumford, George V., to Owens-Illinois, Inc. Fitment-retaining closure. 4,076,152, Cl. 222-545.000.

Munding, German: *See—*
Baum, Werner; and Munding, German, 4,076,082, Cl. 175-14.000.

Munter, Ernst August: *See—*
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Murakami Kaimedio Co., Ltd.: *See—*
Suzuki, Toshiyuki; and Yamauchi, Fumio, 4,076,392, Cl. 350-289.000.

Murakami, Takeru: *See—*
Azuma, Tomisaburo; Ichimaru, Kazuto; Tateno, Kouichi; and Murakami, Takeru, 4,076,545, Cl. 423-544.000.

Murakami, Tomomi; Yoshida, Masaru; Kimura, Satoshi; Yasuda, Tetuya; and Iinuma, Yoshio, to Citizen Watch Co., Ltd. Electronic timepiece substratum. 4,075,825, Cl. 58-23.00R.

Murao, Kenji: *See—*
Nakano, Fumio; Yokokura, Hisao; and Murao, Kenji, 4,076,646, Cl. 252-299.000.

Murase, Shigeo: *See—*
Yamamoto, Toshio; Kamata, Jyoji; Murase, Shigeo; and Yamaguchi, Kouichirou, 4,076,073, Cl. 165-53.000.

Murayama, Keisuke; Asai, Motoji; and Tsuji, Hideakira, to Sankyo Company Limited. Ester of chrysanthemic acid, process for the preparation thereof and insecticidal compositions containing them. 4,076,835, Cl. 424-285.000.

Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for the electrolytic treatment of alkali halide. 4,076,604, Cl. 204-98.000.

Murbach, Warren J.; and Adicoff, Arnold, to United States of America, Navy. Large, nonplanar poly(methyl methacrylate) pre-holographic element. 4,076,772, Cl. 264-2.000.

Murdock Machine & Engineering Co.: *See—*
Herbert, John T.; Kovitch, Frank J.; and Sullivan, Paul E., 4,076,284, Cl. 285-263.000.

Murphy, Clarence Rhodes: *See—*
Boehme, Robert Emerson; and Murphy, Clarence Rhodes, 4,076,681, Cl. 260-33.6PQ.

Murphy, Randall T.: *See—*
Chekirda, Russell F.; and Murphy, Randall T., 4,076,309, Cl. 297-363.000.

Murphy, Richard F.: *See—*
Chierici, Osvaldo F.; and Murphy, Richard F., 4,075,951, Cl. 105-199.00C.

Murray, Lawrence E.: *See—*
Bishop, Burton DeWolfe; and Murray, Lawrence E., 4,076,104, Cl. 187-8.500.

Muska, Willis Martin; and Personick, Stewart David, to Bell Telephone Laboratories, Incorporated. Directional optical waveguide coupler and power tap arrangement. 4,076,375, Cl. 350-96.150.

Nagamatsu, Katsumi; and Saito, Takashi, to Canon Kabushiki Kaisha. Method of and apparatus for electronic color photography and photosensitive member used for the same. 4,076,404, Cl. 355-4.000.

Nagasawa, Masao, to Nippondenso Co., Ltd. Method for operating 2-cycle internal combustion engine. 4,075,989, Cl. 123-117.00R.

Nagasawa, Shigeru; and Okitsu, Toshinao, to Konishi Co., Ltd. Solid adhesive compositions. 4,075,830, Cl. 260-18.00N.

Nagase, Tosiro, to Tokico Ltd. Door closer. 4,075,734, Cl. 16-58.000.

Nagata, Masayoshi: *See—*
Takeda, Keiji; Matsumoto, Kenji; Tamura, Hiroshi; Nagata, Masayoshi; and Tsuboi, Masayoshi, 4,076,530, Cl. 96-29.00R.

Nagornaya, Ljudmila Lavrentievna: *See—*
Gromov, Jury Vasilievich; Leonov, Boris Ivanovich; Smirnov, Oleg Petrovich; Smirnov, Nikolai Nikolaevich; Nagornaya, Ljudmila Lavrentievna; and Zakharin, Yakov Abramovich, 4,076,984, Cl. 250-367.000.

Nakagawa, Isamu: *See—*
Wada, Masamichi; Nakagawa, Isamu; and Mizoguchi, Hiroshi, 4,076,354, Cl. 316-1.000.

Nakahara, Hiromi: *See—*
Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, 4,076,861, Cl. 427-132.000.

Nakahara, Makoto; Fukuyama, Yoshiya; Sumiyoshi, Kazuo; and Akagane, Katsuo, to Sumitomo Chemical Company, Limited. Unsaturated epoxy ester resin. 4,076,765, Cl. 260-835.000.

Nakajima, Hiroyuki; and Hosokawa, Takashi, to Konan Electric Co., Ltd.; and Hosokawa, Takashi. Solenoid operated valve. 4,076,045, Cl. 137-625.650.

Nakamura, Akira: *See—*
Masuda, Fusayoshi; Nishida, Kazuo; and Nakamura, Akira, 4,076,663, Cl. 260-17.4GC.

Nakamura, Iwao, to Taiko Optical Kyogyo Kumiai. Hinges for a spectacle frame. 4,076,394, Cl. 351-153.000.

Nakamura, Kenichi: *See—*
Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, 4,076,604, Cl. 204-98.000.

Nakamura, Kotaro: *See—*
Ota, Satoshi; Nakamura, Kotaro; Sakai, Nobuo; Furutachi, Nobuo; and Yokota, Yukio, 4,076,533, Cl. 96-56.500.

Nakanishi, Hirokazu: *See—*
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.

Nakano, Fumio; Yokokura, Hisao; and Murao, Kenji, to Hitachi, Ltd. Liquid crystal composition for field effect display devices. 4,076,646, Cl. 252-299.000.

Nakaoka, Ichiro: *See—*
Suzuki, Shin; Matsumoto, Kazuo; and Nakaoka, Ichiro, 4,076,606, Cl. 204-157.10R.

Nakase, Takamichi: *See—*
Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, 4,075,835, Cl. 60-276.000.

Nakashima, Katsutoshi; Kita, Toshio; Osawa, Ryuzo; and Hatanaka, Takashi, to Bridgestone Tire Company Limited. Method of mixing and kneading control of a rubber kneader. 4,076,220, Cl. 366-69.000.

Nakatsuka, Ryuzo; Suzuki, Setsuo; Tanimoto, Shinichi; and Funatsu, Eiji, to Sumitomo Bakelite Company Limited. Protein-starch binary molding composition and shaped articles obtained therefor. 4,076,846, Cl. 426-62.000.

Nakayama, Akihiko: *See—*
Kaneda, Kunihiro; Kida, Masashi; Nakayama, Akihiko; Kanazawa, Atsushi; Kaido, Hiroyuki; Mizumoto, Yasuhiro; and Koyama, Tsuneo, 4,076,668, Cl. 260-23.70M.

Nakazato, Takashi; Sawada, Chikamitsu; Umino, Shigeyuki; and Takatsuru, Mitsuhiro, to Max Co., Ltd. Striking tool. 4,075,850, Cl. 60-633.000.

Nalco Chemical Company: *See—*
Vartiak, Joseph F.; and Wortley, George E., 4,076,516, Cl. 71-66.000.

Nalick, David L. Dome construction method. 4,075,813, Cl. 52-747.000.

Namba Press Kogyo Kabushiki Kaisha: *See—*
Nanba, Kunio; and Ogawa, Taro, 4,076,307, Cl. 297-250.000.

Namiki, Kazuo: *See*—
Onoki, Fumio; Namiki, Kazuo; and Osora, Tetsuo, 4,076,863, Cl. 427-165.000.
Nanba, Kunio; and Ogawa, Taro, to Namba Press Kogyo Kabushiki Kaisha. Safety chair for a child for use in motor vehicles. 4,076,307, Cl. 297-250.000.
Nanba, Yasuhiro, to Minolta Camera Kabushiki Kaisha. Exposure indicating device. 4,077,043, Cl. 354-51.000.
National Automatic Tool Company, Inc.: *See*—
Schrolucke, Virgil H., 4,076,339, Cl. 308-9.000.
National Mine Service Company: *See*—
LeBegue, Maurice K., 4,076,316, Cl. 299-64.000.
National Research Development Corporation: *See*—
Brooks, Gerald Thomas, 4,076,832, Cl. 424-278.000.
Naumann, Klaus; Sasse, Klaus; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Method of inhibiting the growth of plants with phospholenium salts. 4,076,517, Cl. 71-86.000.
Naya, Mikio: *See*—
Imura, Toshinori; Maeda, Keisuke; and Naya, Mikio, 4,077,042, Cl. 354-21.000.
Naz, John F. Self-venting bottle closure. 4,076,142, Cl. 215-307.000.
Nazarenko, Nicholas; and Seidel, William Carl, to Du Pont de Nemours, E. I., and Company. Process for the preparation of triarylborane. 4,076,756, Cl. 260-606.50B.
NCR Corporation: *See*—
Lui, Albert S.; and Arbab, Majid, 4,077,028, Cl. 340-146.1AL.
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., 4,077,016, Cl. 331-4.000.
Neafsey, James D., to Chevron Research Company. Extrusion of polypyrrolidone. 4,076,696, Cl. 260-78.00P.
Neal, Edwin S. Power saw cutting guide. 4,075,920, Cl. 83-745.000.
Nealy, Richard H., to Xerox Corporation. Photosensitive composition useful in photoelectrophoretic imaging. 4,076,527, Cl. 96-1.0PE.
Needham, James Joseph: *See*—
Kobeski, Walter Dan; Srocki, Sigismund Walter; Blosser, William Ivan; and Needham, James Joseph, 4,076,862, Cl. 427-136.000.
Neillie, William Frederick Soutar: *See*—
Davies, Charles Bloor; Davies, James Francis; and Neillie, William Frederick Soutar, 4,076,653, Cl. 252-532.000.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-3,7-inter-m-phenylene-3-oxa-9-deoxy-PGD_1 compounds. 4,076,750, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-3,7-inter-m-phenylene-3-oxa-PGE_1 compounds. 4,076,751, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-3,7-inter-m-phenylene-3-oxa-9-deoxy-9,10-didehydro-PGD_1 compounds. 4,076,752, Cl. 260-590.00C.
Nelson, Norman A., to Upjohn Company, The. 2-Decarboxy-2-hydroxymethyl-3,7-inter-m-phenylene-PGE_1 compounds. 4,076,753, Cl. 260-590.00C.
Nesters Housing Company, Inc.: *See*—
Theurer, John; Beck, Orville F.; and Doherty, James T., 4,075,814, Cl. 52-79.500.
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, to Bayer Aktiengesellschaft. Stabilizing crosslinkable copolymers comprising acrylonitrile, N-methylol alkyl ether of unsaturated carboxylic acid amide with (a) amide (b) lactam or (c) urea compounds. 4,076,925, Cl. 526-204.000.
Neuman, Ladislav: *See*—
Hanzelka, Lubomir; Vidlar, Josef; and Neuman, Ladislav, 4,076,298, Cl. 296-28.00R.
Neumann, Friedmund: *See*—
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Neumoyer, Clifton R.: *See*—
Gladstone, Shaul; and Neumoyer, Clifton R., 4,076,918, Cl. 536-59.000.
Neuschatz, Joseph J. Doll showing sickness, and means for "curing". 4,075,782, Cl. 46-118.000.
Newsome, Ernest L. Sports racket. 4,076,241, Cl. 273-73.00D.
Niblock, Hugh David: *See*—
Moore, Travis; and Niblock, Hugh David, 4,076,255, Cl. 273-226.000.
Nicholson, Victor. Bidirectional unicable switching system. 4,077,006, Cl. 325-308.000.
Nickerson, John T. R.; and Darack, John R., to Dirigo Corporation. Composition and method for safely extending storage life of foods. 4,076,850, Cl. 426-332.000.
Nielsen, Robert Gary, to Singer Company, The. Real-time simulation of a point system with a CRT blank period to settle beam transients. 4,077,062, Cl. 364-521.000.
Nightingale, Allen Frederick: *See*—
Yardley, James Frank; and Nightingale, Allen Frederick, 4,076,891, Cl. 428-517.000.
Nightingale, Eric Gordon. *See*—
Jungles, John; Whitehouse, David John; and Nightingale, Eric Gordon, 4,077,048, Cl. 358-89.000.
Nihon Kogyo Kabushiki Kaisha: *See*—
Yuki, Toshihiro, 4,076,523, Cl. 75-77.000.
Niida, Taro: *See*—
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.
Nikolai, William L. Method for sulfur dioxide control. 4,076,793, Cl. 423-242.000.
Nilsson, Bengt: *See*—
Dahlstrom, Lars; and Nilsson, Bengt, 4,076,131, Cl. 214-1.0BC.
Nilsson, Peter J.: *See*—
Malm, Hans R.; Nilsson, Peter J.; and Konicek, Jiri K., 4,075,757, Cl. 29-625.000.
Nipak, Inc.: *See*—
Fisher, Roy Jack, 4,075,916, Cl. 82-78.000.
Nippon Electric Company, Ltd.: *See*—
Higo, Yoshiki, 4,077,004, Cl. 325-2.000.
Ishiguro, Tatsuo, 4,077,053, Cl. 358-136.000.
Nippon Electric Glass Company, Limited: *See*—
Wada, Masamichi; Nakagawa, Isamu; and Mizoguchi, Hiroshi, 4,076,354, Cl. 316-1.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Iwamatsu, Masayuki, 4,077,012, Cl. 330-253.000.
Iyeta, Motoi, 4,076,257, Cl. 274-23.00A.
Nippon Kokan Kabushiki Kaisha: *See*—
Koizumi, Kunihei; Ueda, Takeshi; and Otani, Tatu, 4,076,593, Cl. 201-39.000.
Koyama, Yasujiro; Kitani, Fukuichi; and Nishi, Masaaki, 4,075,812, Cl. 52-747.000.
Nippon Oil Company, Limited: *See*—
Matsuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Fumiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,076,923, Cl. 526-97.000.
Nippon Oil Seal Industry Co., Ltd.: *See*—
Akahori, Masami, 4,076,047, Cl. 137-856.000.
Nippon Soken, Inc.: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroshi, 4,075,835, Cl. 60-276.000.
Kuwakado, Satosi; Kasagi, Takao; and Takei, Toshihiro, 4,076,277, Cl. 280-738.000.
Nippondenso Co., Ltd.: *See*—
Nagasawa, Masao, 4,075,989, Cl. 123-117.00R.
Yamawaki, Masao; Aoki, Katsuo; Ina, Osamu; Suzuki, Takao; Oka, Yoshio; and Hara, Kunihiko, 4,075,972, Cl. 118-6.000.
Nisbet, George C.: *See*—
Bareis, Marvin A.; and Nisbet, George C., 4,075,723, Cl. 9-1.500.
Nischk, Gunther: *See*—
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Nishi, Masaaki: *See*—
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Nishida, Kazuo: *See*—
Masuda, Fusayoshi; Nishida, Kazuo; and Nakamura, Akira, 4,076,663, Cl. 260-17.4GC.
Nishigaki, Masahiko: *See*—
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.
Nishikawa, Masaji; and Sato, Eiichi, to Olympus Optical Co., Ltd. Electrographic process. 4,076,403, Cl. 355-35.00C.
Nishizawa, Minoru: *See*—
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.
Nissan Motor Company, Limited: *See*—
Fujishiro, Takeshi; and Kita, Toru, 4,076,608, Cl. 204-195.00S.
Saito, Masaaki; and Minami, Hidehiro, 4,075,834, Cl. 60-276.000.
Nix, George J.; Barrington, Burchus Q.; Farley, David L.; and Hortman, Norman G., to Halliburton Company. Weight and pressure operated well testing apparatus and its method of operation. 4,076,077, Cl. 166-315.000.
Nnadi, John C., to Mobil Oil Corporation. Overbased polyarylamine-arylhydroxy (alkoxy) sulfides and lubricant compositions containing same. 4,076,636, Cl. 252-25.000.
Nobuoka, Kazuyuki: *See*—
Yamada, Eiji; Yamada, Mutuo; and Nobuoka, Kazuyuki, 4,076,734, Cl. 260-369.000.
Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; Sashihara, Kenji; and Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat developable light-sensitive material. 4,076,534, Cl. 96-63.000.
Nomoto, Masao: *See*—
Hirayama, Yoshio; Ito, Kanichi; Takeuchi, Ryoichi; Nomoto, Masao; and Shiina, Tomoyuki, 4,076,177, Cl. 241-32.000.
Norby, Llaney C., to West Point-Pepperell, Inc. Flame-retardant flocked fabric. 4,076,878, Cl. 428-90.000.
Nordam: *See*—
Keith, Donald B., 4,075,811, Cl. 52-395.000.
Noriega, Luis: *See*—
Mateos, Jose Luis; Noriega, Luis; Huettemann, Richard E.; and Kanojia, Ramesh M., 4,076,805, Cl. 424-195.000.
Norlin Music, Incorporated: *See*—
Morez, Gene S.; and Griffin, James F., 4,077,013, Cl. 330-267.000.
Norman, Lloyd Wendell: *See*—
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Norris, Alan H., and Chambley, Phillip W., to Champion International Corporation. Apparatus for manufacturing filaments of varying denier. 4,075,745, Cl. 28-243.000.
North Star Ice Equipment Company: *See*—
Bartholmey, Don S., 4,075,868, Cl. 62-347.000.

Northern Telecom Limited: *See—*
Olsen, Rolf Einar; and Munter, Ernst August, 4,076,965, Cl. 179-16.0EC.
Ostapovitch, Harold Joseph, 4,076,369, Cl. 339-258.00R.
Nowak, Karl. Ion source for high intensity ion beam. 4,076,993, Cl. 313-360.000.
Nuken G.m.b.H.: *See—*
Hackstein, Karl-Gerhard; Hrovat, Milan; and Wolff, Willi, 4,076,775, Cl. 264-0.500.
Nussbaum, Hans. Hoist mechanism. 4,076,216, Cl. 254-98.000.
Nygren, Gordon W. Golf club with low density and high inertia head. 4,076,254, Cl. 273-173.000.
Nystrom, Ernst Holger: *See—*
Ellingboe, James; Nystrom, Ernst Holger; and Sjovall, Jan Bertil, 4,076,930, Cl. 536-1.000.
Oancea, Alexandru: *See—*
Wijnhoven, Jan M. A.; Oancea, Alexandru; Vanhove, Henri C. J.; and Beets, Roland H. C., 4,076,276, Cl. 280-714.000.
Obermoller, Douglas B., to Raven Industries, Inc. Blower and burner to produce superpressure in a thermal airship. 4,076,188, Cl. 244-98.000.
O'Brien, Edward F., to United States of America, Air Force. Film slewing device for drum type contact printer. 4,076,418, Cl. 355-104.000.
Occidental Oil Shale, Inc.: *See—*
Cha, Chang Yul; Ridley, Richard D.; and Burton, Robert S., III, 4,076,312, Cl. 299-2.000.
Ochiai, Kokichi: *See—*
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Odawara, Kiyoshi: *See—*
Toyota, Akinori; Odawara, Kiyoshi; and Kashiwa, Norio, 4,076,924, Cl. 526-125.000.
O'Donnell, James Kevin: *See—*
Ahmed, Nazeer; O'Donnell, James Kevin; and Schmehl, Glenn Lewis, 4,076,335, Cl. 308-3.500.
Oestreich, Ulrich, to Siemens Aktiengesellschaft. Optical cable with plastic multilayer sheath. 4,076,382, Cl. 350-96.230.
Ogawa, Hiroshi: *See—*
Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, 4,076,861, Cl. 427-132.000.
Yamada, Yasuyuki; Akashi, Goro; and Ogawa, Hiroshi, 4,076,890, Cl. 428-337.000.
Ogawa, Taro: *See—*
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Ogawa, Yasuaki: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.
Ogiso, Mitsutoshi: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.
Ohashi, Takashi: *See—*
Yukuta, Toshio; Ohashi, Takashi; Kojima, Minoru; and Suzuki, Akira, 4,076,654, Cl. 260-2.5AM.
Ohsaki, Mikio; Kawamoto, Toshiaki; and Fujimoto, Osamu, to Sharp Kabushiki Kaisha. Card retrieval system. 4,076,125, Cl. 209-80.500.
Ohtake, Kazuomi. Instrument for making perspective drawing. 4,075,762, Cl. 33-77.000.
Ohtani, Akira: *See—*
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.
Oishi, Kengo; and Suzuki, Osamu, to Fuji Photo Film Co., Ltd. Magnetic tape cassettes. 4,076,186, Cl. 242-199.000.
Oka, Yoshio: *See—*
Yamawaki, Masao; Aoki, Katsuo; Ina, Osamu; Suzuki, Takao; Oka, Yoshio; and Hara, Kunihiko, 4,075,972, Cl. 118-6.000.
Okano, Takeshi: *See—*
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Okitsu, Toshinao: *See—*
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Olafson, Theodore T. Crab pot. 4,075,779, Cl. 43-100.000.
Olesen, Douglas E.; and Shuckrow, Alan J., to Battelle Pacific N. W. Laboratories. Process and system for treating waste water. 4,076,615, Cl. 210-5.000.
Olin Corporation: *See—*
Gray, Thomas J., 4,076,611, Cl. 204-290.00F.
Hoyt, Joseph B., Jr.; and Shapiro, Eugene, 4,076,560, Cl. 148-11.50C.
Mills, Gordon D., 4,076,934, Cl. 536-60.000.
Specht, Steven J.; and Adams, John O., 4,076,571, Cl. 156-305.000.
Olmsted, Bernie A.: *See—*
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Olsen, Rolf Einar; and Munter, Ernst August, to Northern Telecom Limited. Universal receiver/sender. 4,076,965, Cl. 179-16.0EC.
Olson, Richard A., to Hydril Company. Blowout preventer ram lock. 4,076,208, Cl. 251-1.00A.
Olson, Robert H.: *See—*
Clayton, William J.; Olson, Robert H.; and Kutniewski, Donald F., 4,076,121, Cl. 206-390.000.
Olsson, Billy Erik; and Kunkle, John Philip, to AMP Incorporated. Connector for connecting together opposite sides of a printed circuit board. 4,076,355, Cl. 339-17.00C.
Olstowski, Franciszek; and Parrish, Donald Bob, to Dow Chemical Company, The. Non-elastomeric rapid-setting polyurethanes. 4,076,660, Cl. 260-9.000.
Olympus Optical Co., Ltd.: *See—*
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Onikov, Eduard Arshakovich: *See—*
Zabotin, Alexandr Alexandrovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Galperin, Alexandr Lvovich; Santucci, Nicola; and Corain, Luciano, 4,076,051, Cl. 139-436.000.
Onoki, Fumio; Namiki, Kazuo; and Osora, Tetsuo, to Hoya Lens Corporation. Process for cutting and edging chemically pre-strengthened finished uncut lens blanks without loss of impact resistance. 4,076,863, Cl. 427-165.000.
Ontario Paper Company Ltd., The: *See—*
Puddington, Ira E.; Sparks, Bryan D.; and Sexton, Ernest A., 4,076,578, Cl. 162-5.000.
Ooba, Yasumi. Apex seal device for use in rotary piston engine. 4,076,261, Cl. 277-81.00P.
Opferkuch, Robert E., Jr.; and Wong-Chong, George M., to Monsanto Research Corporation. Process for the disposal of sewage. 4,076,620, Cl. 210-45.000.
Oppenlaender, Knut: *See—*
Freyberg, Peter; Horn, Dieter; Oppenlaender, Knut; Wolf, Hans; and Distler, Dieter, 4,076,497, Cl. 8-21.00C.
Optel Corporation: *See—*
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Heimberger, Helmut, 4,075,874, Cl. 66-192.000.
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Nakashima, Katsutoshi; Kita, Toshio; Osawa, Ryuzo; and Hatanaka, Takashi, 4,076,220, Cl. 366-69.000.
Oshida, Naoichi; and Ando, Eiichi, to Kabushiki Kaisha Sato Gijutsu Kenkyusho; and Shinagawa Furnace Co., Ltd. Waste gas purification apparatus. 4,076,504, Cl. 23-277.00C.
Oshimi, Fumiaki: *See—*
Matsuura, Kazuo; Matsuzaki, Masaomi; Oshimi, Fumiaki; Kuroda, Nobuyuki; and Miyoshi, Mituji, 4,076,923, Cl. 526-97.000.
Osora, Tetsuo: *See—*
Onoki, Fumio; Namiki, Kazuo; and Osora, Tetsuo, 4,076,863, Cl. 427-165.000.
Ostapovitch, Harold Joseph, to Northern Telecom Limited. Box terminal for card edge receptacles in telecommunications systems and the like. 4,076,369, Cl. 339-258.00R.
Oswald, Anton H.; and Peters, John, to Bright Star Industries, Inc. Paper-lined dry cell batteries without smears. 4,076,907, Cl. 429-133.000.
Oswald, Donald E., to Kaiser Steel Corporation. Rotator and coater system for drum shells. 4,075,975, Cl. 118-318.000.
Ota, Satoshi; Nakamura, Kotaro; Sakai, Nobuo; Furutachi, Nobuo; and Yokota, Yukio, to Fuji Photo Film Co., Ltd. Silver halide emulsion containing two-equivalent coupler. 4,076,533, Cl. 96-56.500.
Otake, Nobuyuki; Ando, Kozo; and Hori, Hironobu, to Tokyo Boshi Kabushiki Kaisha. Pen points for writing instruments. 4,076,428, Cl. 401-265.000.
Otani, Susumu: *See—*
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Otani, Tatu: *See—*
Koizumi, Kunihei; Ueda, Takeshi; and Otani, Tatu, 4,076,593, Cl. 201-39.000.
Otis Engineering Corporation: *See—*
Sizer, Philip S., 4,076,083, Cl. 175-65.000.
Ott, Denis P.: *See—*
Alpers, Robert J.; Crates, Fredrick J.; Ott, Denis P.; and Schmunk, John D., 4,076,040, Cl. 137-371.000.
Outboard Marine Corporation: *See—*
Blake, Charles H.; and Wood, Donald H., 4,075,970, Cl. 115-18.00E.
Over-Lowe Company, Inc.: *See—*
Dodich, Nicholas Anthony, 4,076,314, Cl. 299-40.000.
Owens-Corning Fiberglas Corporation: *See—*
Clay, Frank M.; Moran, Leland G.; and Lawyer, Russell R., 4,076,781, Cl. 264-40.700.
Owens-Illinois, Inc.: *See—*
Amberg, Stephen W., 4,076,786, Cl. 264-146.000.
Go, Santos W., 4,076,693, Cl. 260-75.00S.
Mumford, George V., 4,076,152, Cl. 222-545.000.
Pei, Yu K., 4,076,513, Cl. 65-33.000.
Rapp, Charles F., 4,076,541, Cl. 106-47.00Q.
Owsley, Dennis C.; and Bloomfield, Jordan J., to Monsanto Company. Synthesis of vicinal glycols. 4,076,758, Cl. 260-618.00R.
Ozen Co., Ltd.: *See—*
Watanabe, Katsumi, 4,076,256, Cl. 274-1.00R.
Paek, Un-Chul: *See—*
Mracek, Jaroslav; and Paek, Un-Chul, 4,076,510, Cl. 65-3.00A.
Pagilagan, Rolando Umali, to Du Pont de Nemours, E. I., and Com-

pany. 612 or 610/6I or 6T/636 Polyamide terpolymer. 4,076,664, Cl. 260-18.00N.
Palmer, Raymond Leslie, to Coventry Gauge & Tool Company Limited. Screw thread tap grinding with automatic loading means. 4,075,790, Cl. 51-94.0CS.
Panamera, A.G.: *See*—
Adams, Horst, 4,076,034, Cl. 137-15.000.
Panigati, Pier Luigi. Piston for pressure fluid operated cylinders. 4,075,935, Cl. 92-243.000.
Panneman, Harm Jan; and Bruins, Antonius Hermanus Nicolaas Maria, to Akzona Incorporated. Amidino-hydrazone derivatives. 4,076,726, Cl. 260-34.50R.
Panusch, Erwin; Sobolev, Igor; and Carniglia, Stephen C., to Kaiser Aluminum & Chemical Corporation. Flame retardant cellulosic boards. 4,076,580, Cl. 162-159.000.
Papantoniou, Christos; and Grognet, Jean-Claude, to L'Oreal. Tetrapolymers comprising (a) unsaturated acids (b) vinyl esters (c) branched allyl or methallyl esters and (d) vinyl ether or vinyl fatty ester or linear allyl or methallyl esters. 4,076,912, Cl. 526-16.000.
Parcor: *See*—
Maffrand, Jean-Pierre, 4,076,819, Cl. 424-256.000.
Parise, Carl; and Wimsatt, James M., to Parise & Sons, Inc. Cleaning head. 4,075,733, Cl. 15-322.000.
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Parise, Carl; and Wimsatt, James M., 4,075,733, Cl. 15-322.000.
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Parker, Louis W. Solar steam boiler. 4,076,025, Cl. 126-271.000.
Parrish, Donald Bob: *See*—
Olstowski, Franciszek; and Parrish, Donald Bob, 4,076,660, Cl. 260-9.000.
Parsons, Stuart L.; and Vigeant, George Henry, deceased (by Vigeant, Mrs. George Henry, heir), to AMP Incorporated. Method for terminating sheath covered cable and for providing a wiring system. 4,075,758, Cl. 29-628.000.
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Busse, Oswald; and Klesper, Hugo, 4,076,033, Cl. 134-172.000.
Pastor, Antonio C.: *See*—
Pastor, Ricardo C.; and Pastor, Antonio C., 4,076,574, Cl. 156-616.00R.
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Horne, Peter Nesbitt, 4,075,839, Cl. 60-327.000.
Pauliukonis, Richard S. Volumetric proportioning diluter. 4,076,465, Cl. 417-339.000.
Paulsen, George T. Cable support method and apparatus. 4,076,199, Cl. 248-68.00R.
Pavlova, Saga-Silviya Alexandrovna: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.
Payne, Trevor Glyn, to Sandoz Ltd. Benzocycloheptene-2-acetic acids. 4,076,838, Cl. 424-317.000.
Payson, Buford L., to Strauss, Robert A., a part interest. Locking tube assembly. 4,076,213, Cl. 254-60.000.
Pearlman, Sanford. Building construction system using mortar-less modular building block elements. 4,075,808, Cl. 52-439.000.
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Pecoraro, Joseph Michael, to Du Pont de Nemours, E. I., and Company. Polyisobutylene oxidation process. 4,076,738, Cl. 260-406.000.
Peets, Edwin A.: *See*—
Ganguly, Ashit K.; Peets, Edwin A.; and Saksena, Anil K., 4,076,711, Cl. 260-256.40F.
Pei, Yu K., to Owens-Illinois, Inc. Method for making transverse tube recuperator. 4,076,513, Cl. 65-33.000.
Peil, Archie W.: *See*—
Slator, Damon T.; Peil, Archie W.; and Bishop, Thomas R., 4,076,436, Cl. 403-343.000.
Pelensky, Joseph: *See*—
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Pelin, Charles. Closed system, standpipe operated hydroelectric power plant. 4,075,838, Cl. 60-325.000.
Pelletier, Ronald R.: *See*—
Saunders, Frank L.; and Pelletier, Ronald R., 4,076,768, Cl. 260-876.00B.
Pennsylvania Engineering Corporation: *See*—
Schempp, Eberhard G., 4,076,223, Cl. 266-158.000.
Pennwalt Corporation: *See*—
Dohany, Julius Eugene, 4,076,929, Cl. 526-255.000.
Spulgis, Ivars Sigurds; Pettit, Jack Leland; Allard, Michael Duane; and Parish, Harold Cheney, 4,076,057, Cl. 141-1.000.
Penrose, Alexander B.: *See*—
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Penton, Michael O., 4,076,272, Cl. 280-421.000.
Penton, Michael O., to Penton Hose Protection Systems, Inc. Retractable conduit system. 4,076,272, Cl. 280-421.000.
Penzias, Rolf, to Molins Limited. Method and apparatus for feeding rod-like articles. 4,075,937, Cl. 93-77.0FT.
Peppard, Eugene Lee. Playing piece for table soccer. 4,076,244, Cl. 273-85.00D.
Perez, Jose R. Safety valve cap for inflatable bodies. 4,076,037, Cl. 137-230.000.
Perkin-Elmer Corporation, The: *See*—
Atwood, John G.; DeMey, Charles F., III; Marshall, Hamilton W., Jr.; and Ducret, Lucien C., 4,076,503, Cl. 23-259.000.
Perne, Raymond, to Astra Plastique. Tamperproof closure element. 4,076,140, Cl. 215-256.000.
Perobelli, Aldo Euclide: *See*—
Pessina, Giorgio; and Perobelli, Aldo Euclide, 4,075,896, Cl. 74-69.000.
Persha, Thomas J.; and Jagielski, David, to Bell & Howell Company. Microfilm transport with automatic threading. 4,076,400, Cl. 353-95.000.
Personick, Stewart David: *See*—
Muska, Willis Martin; and Personick, Stewart David, 4,076,375, Cl. 350-96.150.
Persson, Jan Edvard. Specially reinforced flexible tube pumping chamber. 4,076,467, Cl. 417-478.000.
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Perstorp AB: *See*—
Malm, Hans R.; Nilsson, Peter J.; and Konicek, Jiri K., 4,075,757, Cl. 29-625.000.
Perugini, Giancarlo; and Marcaccioli, Enzo, to Montedison S.p.A. Process for the preparation of metallic and/or metal-ceramic and/or ceramic sponges. 4,076,888, Cl. 428-313.000.
Pessina, Giorgio; and Perobelli, Aldo Euclide. Mechanism for the variable-speed drive of the automatic sheet feeder drum. 4,075,896, Cl. 74-69.000.
Peter Powell International Limited: *See*—
Powell, Peter Trevor, 4,076,189, Cl. 244-153.00R.
Peters, John: *See*—
Oswald, Anton H.; and Peters, John, 4,076,907, Cl. 429-133.000.
Peterson, Paul F., to United States of America, Air Force. Three stage thrusting device. 4,075,929, Cl. 91-168.000.
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Petrocci, Alfonso N.: *See*—
Kaplan, Saul; Merianos, John J.; Green, Harold A.; and Petrocci, Alfonso N., 4,076,744, Cl. 260-501.190.
Petrolite Corporation: *See*—
Redmore, Derek; and Welge, Frederick T., 4,076,638, Cl. 252-33.200.
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Kapitanov, Nikolai Nikolaevich; Ippolitov, Vladimir Vasilievich; Andreeva, Galina Dmitrievna; Petrova, Natalyd Petrovna; and Rabotnikov, Vladimir Semenovich, 4,076,162, Cl. 227-019.000.
Petrovitch, Vladimir. Method and apparatus for forming a concrete roof. 4,076,777, Cl. 264-32.000.
Petrzelka, Miloslav, to Uni-Cardan AG. Variable transmission ratio brake actuating device. 4,075,907, Cl. 74-523.000.
Pettit, Jack Leland: *See*—
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Pevnev, Arkady Alexeevich: *See*—
Lifshits, Viktor Senderovich; Sukhanov, Alexandr Alexandrovich; Dergachev, Nikolai Makarovich; Pevnev, Arkady Alexeevich; Baranov, Vladimir Nikitich; and Shklyanov, Leonid Pavlovich, 4,076,973, Cl. 219-97.000.
Pfaff Industriemaschinen GmbH: *See*—
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Pfister, Rudolf: *See*—
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Pfizer Inc.: *See*—
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Philagro: *See*—
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Phillips, Maurice E. Apparatus for the utilization of solar heat. 4,076,016, Cl. 126-271.000.
Phillips Petroleum Company: *See*—
Clampitt, Richard L., 4,076,628, Cl. 252-8.50C.
Harper, Bobby R., 4,076,669, Cl. 260-23.70R.
Haskell, Donald M., 4,076,595, Cl. 203-51.000.
Mills, Kenneth R., 4,076,689, Cl. 260-45.75W.
Moczygemba, George A.; and Hsieh, Henry L., 4,076,914, Cl. 526-25.000.

Scott, John N., Jr.; and Carrow, Guy E., 4,076,282, Cl. 285-156.000.
Trepka, William J., 4,076,915, Cl. 526-25.000.
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Philofsky, Elliott M.: *See—*
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Photocircuits Division of Kollmorgen Corporation: *See—*
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Pichouron, Jean-Claude: *See—*
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Pied, Jean-Philippe, to Societe des Plastiques de Carmaux Scasar. Method for increasing the productive yield of crops with polyolefin films. 4,075,784, Cl. 47-9.000.

Piesch, Steffen: *See—*
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Pietsch, Wolfgang B., to Midrex Corporation. Method for continuous passivation of sponge iron material. 4,076,520, Cl. 75-5.000.

Pike, Allan R., to Marger, Jerome S., a part interest. Portable, readily storable patient treatment table. 4,076,230, Cl. 269-328.000.

Pilkington Brothers Limited: *See—*
Farragher, Joseph, 4,076,159, Cl. 225-3.000.
Mellor, James Robert; and Billington, Colin, 4,076,512, Cl. 65-29.000.

Pinney, Paul E. Dual wave motion pump. 4,076,464, Cl. 417-332.000.

Pioneer Electronic Corporation: *See—*
Fujie, Seijiro; Yokoyama, Susumu, deceased; and Yokoyama, Toshikazu, administrator, 4,076,963, Cl. 179-15.0BT.

Pippenger, John J., to W. H. Nichols Company. Combined distributor and bypass valve for fluid actuated pump or motor. 4,076,462, Cl. 417-310.000.

Pirson, Ewald: *See—*
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Pitt, John M.: *See—*
Handy, Richard L.; Girard, Leon E.; Roorda, Bruce R.; and Pitt, John M., 4,075,885, Cl. 73-88.00E.

Pitts, Robert W., Jr., to Texaco Inc. Well logging method and means using an armored multiconductor coaxial cable. 4,077,022, Cl. 333-1.000.

Place, George H., Jr., to Xerox Corporation. Duplex copying transfer system. 4,076,407, Cl. 355-14.000.

Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., to Mobil Oil Corporation. Crystalline zeolite ZSM-23 and synthesis thereof. 4,076,842, Cl. 423-328.000.

Plass, Ludolf: *See—*
Reh, Lothar; Schmidt, Hans-Werner; and Plass, Ludolf, 4,076,796, Cl. 423-659.000.

Platakis, Nicolaos S.; and Gatos, Harry C., to Massachusetts Institute of Technology. Method of growing films by flash vaporization. 4,076,866, Cl. 427-250.000.

Platt, Clark I., to Whirlpool Corporation. Filter system for washing machine. 4,075,876, Cl. 68-18.00F.

Plessey Handel und Investments A.G.: *See—*
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Wren, John Pelham, 4,076,258, Cl. 274-23.00R.

Plevak, Lubomir: *See—*
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Plows, Graham Stuart; and Castle, Paul, to Decca Limited. Apparatus for depositing uniform films. 4,075,974, Cl. 118-52.000.

Plummer, Sherman R.: *See—*
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Plungis, Donald W.: *See—*
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Pochert, Johannes: *See—*
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Poirot, James M.: *See—*
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Pole, Robert Vladimir; and Wollenmann, Hans Peter, to International Business Machines Corporation. Two-dimensional light deflector apparatus. 4,076,372, Cl. 350-6.900.

Politechnika Warszawska: *See—*
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Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.

Polymer Processing Research Institute Ltd: *See—*
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Polymetrics International Inc.: *See—*
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Polyproducts Corporation: *See—*
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Pope, William M.; and Pope, William M., Jr. Tamper-resistant electric meter sealing ring. 4,076,291, Cl. 292-256.670.

Pope, William M., Jr.: *See—*
Pope, William M.; and Pope, William M., Jr., 4,076,291, Cl. 292-256.670.

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Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjusherko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

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Turbak, Albin Frank; Hammer, Richard Benjamin; Portnoy, Norman A.; and West, Arthur C., 4,076,933, Cl. 536-30.000.

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Powell, Peter Trevor, to Peter Powell International Limited. Kites. 4,076,189, Cl. 244-153.00R.

Power, George Edward, to Formica Corporation. Method of preparing decorative textured laminates. 4,076,566, Cl. 156-153.000.

Power, George Edward; and Bolling, Donald Louis, to Formica Corporation. Release composition. 4,076,666, Cl. 260-22.0CB.

PPG Industries, Inc.: *See—*
Fulton, Robert C.; Edmunds, Donald L.; and Shields, George B., 4,076,511, Cl. 65-27.000.
Kelly, Joseph B., 4,076,514, Cl. 65-106.000.

Prat, Jean-Claude Alphonse Henri: *See—*
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Primark Corporation: *See—*
Conley, Dwain D., 4,075,944, Cl. 101-94.000.

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Procter & Gamble Company, The: *See—*
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Proksch, Frederick D., to Caterpillar Tractor Co. Device for reducing engine exhaust noise. 4,076,099, Cl. 181-264.000.

Proulx, Roger. Warm air heating and fire-place system. 4,076,011, Cl. 126-121.000.

Proven Environmental Products, Inc.: *See—*
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Puccio, Guy S., to Acme Highway Products Corporation. Adjustable embossment connector for a composite expansion joint assembly. 4,075,728, Cl. 14-16.500.

Pucher, Richard A.: *See—*
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Puddington, Ira E.; Sparks, Bryan D.; and Sexton, Ernest A., to Canadian Patents and Development Limited; and Ontario Paper Company Ltd., The. Ink removal from waste paper. 4,076,578, Cl. 162-5.000.

Purvis, Michael J.: *See—*
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R. Kanik Sales, Ltd.: *See—*
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R. O. Hull & Company, Inc.: *See—*
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Raas, Jean H.; and Schwartz, Joseph I., to Diamond Power Specialty

Corporation. Top closure for control rod drive for nuclear reactor. 4,076,144, Cl. 220-367.000.
Rabl, Carl-Roland: *See—*
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Raimondi, Albert A., to Westinghouse Electric Corporation. Static sealing mechanism for liquid natural gas compressors and hydrogen cooled generators. 4,076,259, Cl. 277-3.000.
Ramsil, Wilfried; Schraudolph, Manfred; and Thiele, Gerd, to Siemens Aktiengesellschaft. Gas-insulated thyristor arrangement comprising a pressure encapsulation formed in the manner of a tank. 4,077,057, Cl. 361-386.000.
Rameson, William W., to TRW Inc. Self-aligning work holding clamp. 4,076,227, Cl. 269-25.000.
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Rank Organisation Limited, The: *See—*
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Rapp, Charles F., to Owens-Illinois, Inc. Glasses suitable for laser application, glass lasers, and method for making same. 4,076,541, Cl. 106-47.00Q.
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Rast, Robert Morgan; and Tults, Juri, to RCA Corporation. Phase locked loop tuning system with station scanning provisions. 4,077,008, Cl. 325-421.000.
Rau, Rama N., to Schlumberger Technology Corporation. Microwave method and apparatus utilizing dielectric loss factor measurements for determination of adsorbed fluid in subsurface formations surrounding a borehole. 4,077,003, Cl. 324-6.000.
Raudat, John L.; and Johnson, Lloyd D., to Emhart Industries, Inc. Finger assembly for packer grid. 4,075,819, Cl. 53-248.000.
Rauffer, Walter: *See—*
Deml, Reinhold; Greis, Ulrich; Hofmann, Wilfried; and Rauffer, Walter, 4,076,384, Cl. 350-122.000.
Rauschenbach, Gerhard: *See—*
Fritz, Heinz Peter; Besenhardt, Jurgen; and Rauschenbach, Gerhard, 4,076,901, Cl. 429-50.000.
Raven Industries, Inc.: *See—*
Obermoller, Douglas B., 4,076,188, Cl. 244-98.000.
Ray, Edward D. Direct conversion of solar energy to mechanical energy. 4,075,847, Cl. 60-527.000.
Rayfield, Jerry W.: *See—*
Short, Buddy M.; and Rayfield, Jerry W., 4,076,871, Cl. 427-397.000.
Raymond Lee Organization, Inc., The: *See—*
Allison, Harvey W., 4,076,348, Cl. 312-231.000.
Dively, Robert M., 4,076,238, Cl. 273-1.00R.
Hannebaum, Harold W., 4,076,009, Cl. 126-120.000.
McKinney, Robert D., 4,077,007, Cl. 325-315.000.
Singh, Dharam Dev, 4,076,360, Cl. 339-36.000.
Sneathen, James, Jr., 4,076,249, Cl. 273-256.000.
Raytheon Company: *See—*
Bryden, Joseph E., 4,077,037, Cl. 343-5.0EM.
RCA Corporation: *See—*
Anderson, Charles Hammond, 4,076,994, Cl. 313-422.000.
Binge, Derek Sidney, 4,076,191, Cl. 244-173.000.
Dholakia, Anil Ramniklal, 4,077,050, Cl. 358-128.000.
Endriz, John Guiry, 4,077,054, Cl. 358-242.000.
Gross, Harvey Andrew; Frey, Harry Robert; Messner, John David; and Walters, Raymond Frederick, 4,076,426, Cl. 356-239.000.
Mark, John Thomas, 4,076,992, Cl. 313-296.000.
Rast, Robert Morgan; and Tults, Juri, 4,077,008, Cl. 325-421.000.
Shaw, Joseph Michael; and Zaininger, Karl Heinz, 4,076,573, Cl. 156-613.000.
Vossen, John Louis, Jr., 4,077,051, Cl. 358-128.000.
Vossen, John Louis, Jr., 4,077,052, Cl. 358-128.000.
Wardell, Myron Henry, Jr.; and Marks, Bruce George, 4,076,366, Cl. 339-144.00T.
Rearick, William A., to ICI Americas Inc. Treatment of textile materials. 4,076,500, Cl. 8-139.100.
Rederiaktiebolaget Nordstjernan: *See—*
Archer, John Neville; and Larsson, Hans Folke, 4,076,068, Cl. 160-107.000.
Redlin, Eugene E. Gemstone drill. 4,076,007, Cl. 125-30.00R.
Redmore, Derek; and Welge, Frederick T., to Petrolite Corporation. Oil-soluble aluminum compositions. 4,076,638, Cl. 252-33.200.
Redo, Dennis M.: *See—*
Thompson, Walter F.; and Redo, Dennis M., 4,076,132, Cl. 214-16.40A.
Reed Tool Company: *See—*
Barker, Lynn M., 4,075,886, Cl. 73-88.00R.
Regie Nationale des Usines Renault: *See—*
Lefebvre, Jean; and Pichouron, Jean-Claude, 4,076,070, Cl. 164-303.000.
Reginensi, Jean-Pierre; and Slack, Peter, to Alsthom-Atlantique S.A. Motor housing for a retractable propulsion unit for boats. 4,075,971, Cl. 115-41.00R.
Reh, Lothar; Schmidt, Hans-Werner; and Plass, Ludolf, to Metallgesellschaft Aktiengesellschaft. Carrying out endothermic processes in fast fluidized reactor with conventionally fluidized holding reactor. 4,076,796, Cl. 423-659.000.
Reid, Michael Gerald; Burlew, Leroy Ellery; and Hogan, David Charles, to Eastman Kodak Company. Collating document feeder with multiple feed detector. 4,076,408, Cl. 355-14.000.
Reilly, George W.: *See—*
Burden, Ivor R.; and Reilly, George W., 4,075,783 Cl. 47-1.410.
Reimschuessel, Herbert K.: *See—*
Akkapeddi, Murali K.; and Reimschuessel, Herbert K., 4,076,680, Cl. 260-32.60R.
Reinehr, Ulrich: *See—*
Neukam, Theo; Reinehr, Ulrich; Bentz, Francis; and Nischk, Gunther, 4,076,925, Cl. 526-204.000.
Reinforcing & Allied Industries (Proprietary) Limited: *See—*
Copeland, William Raeburn, 4,075,880, Cl. 72-64.000.
Reinsma, Harold Lawrence: *See—*
Forster, Kevin George; and Reinsma, Harold Lawrence, 4,076,345, Cl. 308-120.00A.
Reiss, David. Down filling machine. 4,076,320, Cl. 302-3.000.
Reitmayer, Franz: *See—*
Faulstich, Marga; and Reitmayer, Franz, 4,076,647, Cl. 252-301.40P.
Remark, Preben Michael; and Jensen, Aksel Johannes, to Remark, Preben Michael. Engagement lock having two stages of engagement and associated method. 4,075,742, Cl. 24-211.00R.
Remy, David C.: *See—*
Anderson, Paul S.; and Remy, David C., 4,076,714, Cl. 424-267.000.
Ren, Chung-Li; and Wang, Han-Chiu, to Bell Telephone Laboratories, Incorporated. Launching and/or receiving network for an antenna feedhorn. 4,077,039, Cl. 343-786.000.
Rengo Co., Ltd.: *See—*
Tokuno, Masateru, 4,076,114, Cl. 198-425.000.
Renner, Alfred: *See—*
Forgo, Imre; Renner, Alfred; and Schmitter, Andre, 4,076,697, Cl. 260-78.0UA.
Reubke, Karl-Julius; Bien, Hans-Samuel, deceased (by Bien, Else, nee Geriche, heiress); Bien, Gabriele; and Bien, Dorothee, to Bayer Aktiengesellschaft. Preparation of aminoanthraquinones from nitroanthraquinones. 4,076,736, Cl. 260-382.000.
Rexnord, Inc.: *See—*
Gundlach, Theodore F.; and Hawthorne, Arthur L., 4,076,315, Cl. 299-64.000.
Rheinisch-Westfalisches Elektrizitatswerk AG: *See—*
Fritz, Heinz Peter; Besenhardt, Jurgen; and Rauschenbach, Gerhard, 4,076,901, Cl. 429-50.000.
Rhone-Poulenc Industries: *See—*
Boesch, Roger, 4,076,824, Cl. 424-272.000.
Jacques, Roland, 4,076,651, Cl. 252-451.000.
Rhone-Poulenc Textile: *See—*
Fontanel, Daniel; and Rampin, Jean, 4,076,667, Cl. 260-22.00A.
Ribeton, Jean Marie, to Societe Alsa Clienne de Constructions Mecaniques de Mulhouse. Diesel engines. 4,075,990, Cl. 123-119.00C.
Richard, William R., Jr.: *See—*
Herber, John F.; Richard, William R., Jr.; and Street, Robert W., 4,076,642, Cl. 252-78.500.
Richard Wolf GmbH: *See—*
Heckele, Helmut, 4,076,018, Cl. 128-6.000.
Richards, Gerald F.: *See—*
Heckley, Warner M.; and Richards, Gerald F., 4,075,822, Cl. 56-1.000.
Richardson, Frank B. Electromagnetic convertor with stationary variable-reluctance members. 4,077,001, Cl. 323-92.000.
Richardson, Neil Ray, to Garrett Corporation, The. Turbocharger regulator. 4,075,849, Cl. 60-602.000.
Rickard, M. David. Method for treatment of digester supernatant and other streams in wastewater treatment facilities. 4,076,515, Cl. 71-10.000.
Ricoh Company, Ltd.: *See—*
Kanno, Tadaaki; and Ikeda, Sunao, 4,076,402, Cl. 355-3.0DR.
Ridley, Richard D.: *See—*
Cha, Chang Yul; Ridley, Richard D.; and Burton, Robert S., III, 4,076,312, Cl. 299-2.000.
Rieger, Franz: *See—*
Linder, Ernst; Wossner, Gunter; Maurer, Helmut; and Rieger, Franz, 4,075,992, Cl. 123-119.00A.
Riegler, Ernst, to Hoechst Aktiengesellschaft. Process and apparatus for shirring tubular casings. 4,075,736, Cl. 17-42.000.

Riesner, Detlev: *See*—
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.
Rieter Machine Works, Ltd.: *See*—
Staheli, Paul, 4,075,739, Cl. 19-240.000.
Rigler, Rudolf: *See*—
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, to University of Toronto, The Governing Council of the. Fibre reinforcing composites. 4,076,884, Cl. 428-255.000.
Rinard, James Franklin, to Hercules Incorporated. Space frame seat assembly. 4,075,722, Cl. 5-351.000.
Rinehart, Kenneth L., Jr.; Antosz, Frederick J.; and Sasaki, Kazuya, to University of Illinois Foundation. Derivatives of streptovaricin ansamycins. 4,076,725, Cl. 260-340.300.
Rio Tinto (Rhodesia) Limited: *See*—
Hollaway, John William, 4,076,612, Cl. 208-8.000.
Ripley, Ian Stanley: *See*—
Milner, David Lee; and Ripley, Ian Stanley, 4,076,926, Cl. 526-209.000.
Risberg, Carl, Jr. Entertainment and exercise device. 4,076,235, Cl. 272-33.00A.
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, to Bayer Aktiengesellschaft. Automatic sample-changer for mass spectrometers. 4,076,982, Cl. 250-288.000.
Robert Bosch GmbH: *See*—
Bertling, Johannes-Gerhard, 4,075,993, Cl. 123-119.0EC.
Brammer, Hartmut; Ehrmann, Karl; Haug, Heinz; Issler, Jorg; Kas, Gunter; Kalippke, Harald; Magdefrau, Herbert; and Schneider, Karl-Heinz, 4,075,752, Cl. 29-434.000.
Kramer, Manfred, 4,075,995, Cl. 123-139.0AW.
Krauss, Heinz; Kauhl, Gunther; and Steinke, Leo, 4,075,998, Cl. 123-179.00H.
Leiber, Heinz, 4,076,330, Cl. 303-92.000.
Linder, Ernst; Wossner, Gunter; Maurer, Helmut; and Rieger, Franz, 4,075,992, Cl. 123-119.00A.
Vogel, Eberhard; Glaser, Herbert; Kleider, Albert; and Dietz, Klaus, 4,075,793, Cl. 51-170.0TL.
Roberts, John S., to Kling-Tecs, Inc. Compression crimping apparatus. 4,075,743, Cl. 28-263.000.
Roberts, John S., to Kling-Tecs, Inc. Compression crimping apparatus. 4,075,746, Cl. 28-264.000.
Roberts, Thomas E., Jr., to FMC Corporation. Self-leveling static wheel balancer. 4,075,891, Cl. 73-483.000.
Robertshaw Controls Company: *See*—
Tyler, Hugh J.; and Wolfe, Denis G., 4,076,975, Cl. 219-483.000.
Robertson, Jerry E.: *See*—
Harrington, Joseph Kenneth; Kvam, Donald C.; Mendel, Arthur; and Robertson, Jerry E., 4,076,519, Cl. 71-103.000.
Robinson, Harold R., to United States of America, Army. Electronic circuitry for maintaining constant engine speed fuel injection. 4,075,983, Cl. 123-32.0EA.
Robinson, Prentice I.; and Butterfield, Thomas T., to Centronics Data Computer Corporation. Registration means for printers and the like. 4,076,111, Cl. 197-1.00R.
Robroy Industries: *See*—
Young, James M., 4,076,280, Cl. 285-39.000.
Rock, Erich; and Mages, Bernhard, to Julius Blum Gesellschaft m.b.H. Snap-toggle hinge. 4,075,735, Cl. 16-145.000.
Rockwell International Corporation: *See*—
Ash, Edward B.; Bernath, Louis; and Facha, Joseph V., 4,076,583, Cl. 176-35.000.
Sammells, Anthony F., 4,076,905, Cl. 429-112.000.
Rockwell-Rimoldi S.p.A.: *See*—
Marforio, Nerino, 4,075,957, Cl. 112-153.000.
Roesch, Egon: *See*—
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.
Rogan, John, to Dart Industries Inc. High fatigue strength check valve. 4,076,043, Cl. 137-539.500.
Rohm and Haas Company: *See*—
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,076,741, Cl. 260-465.00F.
Bright, Alan, 4,076,671, Cl. 260-28.5AV.
Costin, C. Richard, 4,076,622, Cl. 210-64.000.
Stewart, Thomas; and Landau, Frederick W., 4,076,950, Cl. 560-218.000.
Swift, Graham; and Cenci, Harry J., 4,076,917, Cl. 526-49.000.
Weir, W. David; and Kilbourn, Edward E., 4,076,809, Cl. 424-211.000.
Rohr, Horst: *See*—
Braun, Werner; Decker, Gernot; and Rohr, Horst, 4,076,371, Cl. 350-3.610.
Roman, Steven A.; and Powell, James E., to Shell Oil Company. Derivatives of 3-oxomethyl-2-(1-nitro-2-oxoethylidene)-tetrahydro-2H-1,3-thiazines as insecticides. 4,076,813, Cl. 424-246.000.
Roof, Earl O. Convertible lawn care apparatus. 4,076,460, Cl. 417-236.000.
Roorda, Bruce R.: *See*—
Handy, Richard L.; Girard, Leon E.; Roorda, Bruce R.; and Pitt, John M., 4,075,885, Cl. 73-88.00E.
Rosen, Meyer Robert, to Union Carbide Corporation. Self-dispersible antifoam compositions. 4,076,648, Cl. 252-358.000.
Rosen, Perry, to Hoffmann-La Roche Inc. 3β,14β-Dihydroxy-14,17-seco-D-bisnorandrostan-17-oic acid derivatives. 4,076,944, Cl. 560-5.000.
Rosenberg, Harry: *See*—
Elsner, Burckhardt; Lagodka, Gunter; Plevak, Lubomir; and Rosenberg, Harry, 4,075,857, Cl. 61-45.00D.
Rosenberger, Siegfried, to Ciba-Geigy Corporation. Phosphonates, process for their manufacture and organic materials stabilized therewith. 4,076,690, Cl. 260-45.95D.
Rosenkranz, Otto; Goos, Heinz; and Seifert, Karl-Heinrich, to Heidenreich & Harbeck Zweigniederlassung der Gildemeister AG. Method for heating plastics materials. 4,076,071, Cl. 165-2.000.
Rosinski, Edward J.: *See*—
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,076,842, Cl. 423-328.000.
Ross, Milton Dean; Boutcher, Andrew Graham; and Shatto, Walter Clifton, to AMP Incorporated. Electrical connector having conductor spreading means. 4,076,365, Cl. 339-107.000.
Ross Operating Valve Company: *See*—
Bitonti, Paul A., 4,075,928, Cl. 91-29.000.
Ross, Robert R., to United Centrifugal Pumps. Double volute pump with replaceable lips. 4,076,450, Cl. 415-197.000.
Rossi, Alberto: *See*—
Haas, Georges; and Rossi, Alberto, 4,076,822, Cl. 424-263.000.
Rossio, John H., to LaRos Equipment Company, Inc. Means for removing a molded component from a molding machine. 4,076,478, Cl. 425-215.000.
Roth, Michael; and Bosch, Erhard, to Wacker-Chemie GmbH. Rendering building materials hydrophobic. 4,076,868, Cl. 427-348.000.
Rothbart, George B.: *See*—
Sparks, Robert A.; Rothbart, George B.; and Samdahl, Roger N., 4,076,981, Cl. 250-272.000.
Rottmann, Dieter: *See*—
Klank, Otto; and Rottmann, Dieter, 4,077,009, Cl. 325-455.000.
Rowland-Hill, Edward W., to Sperry Rand Corporation. Combine harvester. 4,075,823, Cl. 56-14.600.
Rubin, Leon J.: *See*—
Bharucha, Kekhusroo R.; Rubin, Leon J.; and Cross, Charles K., 4,076,849, Cl. 426-266.000.
Rubin, Mae K.: *See*—
Plank, Charles J.; Rosinski, Edward J.; and Rubin, Mae K., 4,076,842, Cl. 423-328.000.
Ruder, Gary: *See*—
Fennimore, Jack; Ruder, Gary; and Simmonite, Donald, 4,076,892, Cl. 428-407.000.
Rupp, Raymond W.: *See*—
Muivaney, James E.; and Rupp, Raymond W., 4,076,526, Cl. 96-1.50R.
Rupprecht, Hans Stephen; and Schwenker, Robert Otto, to International Business Machines Corporation. Method of high current ion implantation and charge reduction by simultaneous kerf implant. 4,076,558, Cl. 148-1.500.
Russell, William: *See*—
Alms, Erhardt E.; DeVale, Donald P.; and Russell, William, 4,076,492, Cl. 432-43.000.
Rustad, Stanley C.: *See*—
Davis, Noel; Haub, John T.; and Rustad, Stanley C., 4,075,949, Cl. 104-162.000.
Ruti Machinery Works Ltd: *See*—
Strauss, Edgar, 4,076,050, Cl. 139-436.000.
Rutzen, Horst: *See*—
Koch, Karlheinz; and Rutzen, Horst, 4,076,743, Cl. 260-501.130.
Ryan, Terry W.: *See*—
Feucht, Dennis D.; and Ryan, Terry W., 4,076,194, Cl. 248-9.000.
Ryder, James H.; Brown, David C.; and Van Haastert, Johannes A., to Sierra Engineering Co. Helmet characterized by negative lift. 4,075,714, Cl. 2-6.000.
Ryder, William S.; and Mezzino, Joseph F., to General Foods Corporation. Soluble coffee process. 4,076,855, Cl. 426-594.000.
Ryon, Donald Carroll, to Motorola, Inc. Digital pulse doubler with 50 percent duty cycle. 4,077,010, Cl. 328-20.000.
S&C Electric Company: *See*—
Bernatt, Joseph; and Steegmueller, Alfred, 4,075,755, Cl. 29-623.000.
Sable, Frank Robert, to Towmotor Corporation. Operator's seat assembly. 4,076,302, Cl. 296-65.00R.
Sacchetti, Alfred D. Sewing machine automatic thread changer. 4,075,958, Cl. 112-163.000.
Sachsze, Werner: *See*—
Buelow, Horst; Hohenschutz, Heinz; Schmidt, Johannes E.; and Sachsze, Werner, 4,076,594, Cl. 203-15.000.
Sackner Products, Inc.: *See*—
Corcoran, Jack C., 4,076,886, Cl. 428-294.000.
Sacks, Jack, to Singer & Singer, a part interest. Impulse noise reduction system. 4,076,969, Cl. 179-100.40D.
Saetti, Renato, to Fiat Trattori S.p.A. Track for track laying agricultural tractors and like vehicles. 4,076,334, Cl. 305-54.000.
Sain, Bernard S. Orthopedic cast construction. 4,076,019, Cl. 128-83.000.
St. Pierre, Raymond Marie: *See*—
Bass, Sidney; and St. Pierre, Raymond Marie, 4,075,955, Cl. 112-79.00R.
Saito, Haruhiko; and Morishita, Michio, to Toyota Jidosha Kogyo

Kabushiki Kaisha. Carburetor with auxiliary accelerator-pump system. 4,076,770, Cl. 261-34.00A.
Saito, Kazuo, deceased: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.
Saito, Masaaki; and Minami, Hidehiro, to Nissan Motor Company, Limited. Air-fuel ratio control adjusting system in an internal combustion engine. 4,075,834, Cl. 60-276.000.
Saito, Nobuko, administrator: *See—*
Inouye, Shigeharu; Shomura, Takashi; Kojima, Michio; Ogawa, Yasuaki; Watanabe, Hiroshi; Kondo, Yasumitsu; Saito, Kazuo, deceased; Yamada, Yujiro; and Niida, Taro, 4,076,588, Cl. 195-36.00C.
Saito, Takashi: *See—*
Nagamatsu, Katsumi; and Saito, Takashi, 4,076,404, Cl. 355-4.000.
Saka, Tatsuo: *See—*
Maehara, Naoyoshi; Fujieda, Hiroshi; and Saka, Tatsuo, 4,076,996, Cl. 315-106.000.
Sakagami, Teruo: *See—*
Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, 4,076,604, Cl. 204-98.000.
Sakai, Nobuo: *See—*
Ota, Satoshi; Nakamura, Kotaro; Sakai, Nobuo; Furutachi, Nobuo; and Yokota, Yukio, 4,076,533, Cl. 96-56.500.
Sakashita, Masami, to Yoshida Kogyo K.K. Corner piece for miter joint. 4,076,439, Cl. 403-402.000.
Saksena, Anil K.: *See—*
Ganguly, Ashit K.; Peets, Edwin A.; and Saksena, Anil K., 4,076,711, Cl. 260-256.40F.
Salomon, Georges Pierre Joseph, to Societe Anonyme des Etablissements Francois Salomon & Fils. Ski brakes. 4,076,274, Cl. 280-605.000.
Saltz, Julian. Opacity measuring apparatus. 4,076,425, Cl. 356-205.000.
Samdahl, Roger N.: *See—*
Sparks, Robert A.; Rothbart, George B.; and Samdahl, Roger N., 4,076,981, Cl. 250-272.000.
Samejima, Hiroshi, to Mitsubishi Petrochemical Co., Ltd. Curable mixed polyester resin compositions. 4,076,767, Cl. 260-862.000.
Sammells, Anthony F., to Rockwell International Corporation. Electrode for electrical energy storage device. 4,076,905, Cl. 429-112.000.
Sanders Associates, Inc.: *See—*
Baer, Ralph H., 4,077,049, Cl. 358-93.000.
Sanders, David E.; Chambers, Ramon P.; and Gordy, Robert S., to NCR Corporation. Apparatus and method for inhibiting false locking of a phase-locked loop. 4,077,016, Cl. 331-4.000.
Sanders, David Leonard. Device for lubricating the slide rails on snowmobiles traveling over packed snow. 4,076,089, Cl. 180-5.00R.
Sanders, Davis A., Jr. Power generating water turbine. 4,076,448, Cl. 415-2.000.
Sanders, James Milton: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.
Sandoz Ltd.: *See—*
Fehr, Theodor; and Hauth, Hartmut, 4,076,715, Cl. 260-285.500.
Payne, Trevor Glyn, 4,076,838, Cl. 424-317.000.
Schuster, Johann; and Taubert, Karl, 4,076,494, Cl. 8-2.50A.
Sankyo Company Limited: *See—*
Murayama, Keisuke; Asai, Motoji; and Tsuji, Hideakira, 4,076,835, Cl. 424-285.000.
Seki, Isao; Kitano, Noritoshi; and Kondo, Fusao, 4,076,814, Cl. 424-248.500.
Sansone, Leonard F., to Sussex Plastics Engineering, Inc. Annular extrusion die. 4,076,481, Cl. 425-376.00B.
Santucci, Nicola: *See—*
Zabotin, Alexandr Alexandrovich; Loschilin, Evgeny Dmitrievich; Onikov, Eduard Arshakovich; Galperin, Alexandr Lvovich; Santucci, Nicola: and Corain, Luciano, 4,076,051, Cl. 139-436.000.
Sanyo Chemical Industries, Ltd.: *See—*
Masuda, Fusayoshi; Nishida, Kazuo; and Nakamura, Akira, 4,076,663, Cl. 260-17.4GC.
Sanyo Shokai Ltd.: *See—*
Sato, Koichi, 4,076,881, Cl. 428-195.000.
Sargisson, Donald Farley, to General Electric Company. Variable area inlet for a gas turbine engine. 4,075,833, Cl. 60-262.000.
Sasaki, Kazuya: *See—*
Rinehart, Kenneth L., Jr.; Antosz, Frederick J.; and Sasaki, Kazuya, 4,076,725, Cl. 260-340.300.
Sasaki, Kunimasa: *See—*
Iwasaki, Takeshi; Fujikawa, Yasuo; and Sasaki, Kunimasa, 4,075,890, Cl. 73-295.000.
Sasaki, Tohru; Terasaki, Syuuzi; and Ichii, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Heat-insulation material. 4,076,889, Cl. 428-333.000.
Sasakura, Kazuyuki: *See—*
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,702, Cl. 260-112.50R.
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,703, Cl. 260-112.50R.
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,704, Cl. 260-112.50R.
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,705, Cl. 260-112.50R.
Sashihara, Kenji: *See—*
Noguchi, Yasuhiro; Sekikawa, Nobuyoshi; Sashihara, Kenji; and Masuda, Takao, 4,076,534, Cl. 96-63.000.
Sasse, Klaus: *See—*
Naumann, Klaus; Sasse, Klaus; and Lurssen, Klaus, 4,076,517, Cl. 71-86.000.
Sastre, David: *See—*
Bundy, Wayne M.; Berberich, Joseph P.; and Sastre, David, 4,076,548, Cl. 106-288.00B.
Sato, Eiichi: *See—*
Nishikawa, Masaji; and Sato, Eiichi, 4,076,403, Cl. 355-35.00C.
Sato, Koichi, to Sanyo Shokai Ltd. Interlining structure for apparel and method for its production. 4,076,881, Cl. 428-195.000.
Satoh, Akihiro; Takahashi, Akio; Masuda, Jun; Harada, Masato; and Yamada, Sadahiko, to Chisso Corporation. Method for producing ethylene polymers. 4,076,922, Cl. 526-97.000.
Satoh, Ken, to Olympus Optical Co., Ltd. Automatic gain control circuit. 4,077,014, Cl. 330-278.000.
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Satzinger, Gerhard: *See—*
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Vigelius, Wolf-Dieter; Satzinger, Gerhard; and Herrmann, Manfred, 4,076,937, Cl. 544-171.000.
Satzinger, Roland. Vehicle seat rest. 4,076,306, Cl. 297-216.000.
Saucy, Gabriel: *See—*
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Sauer, Louis E., to L. E. Sauer Machine Company. Rotary anvil cover. 4,075,918, Cl. 83-659.000.
Sauli, Michel, to Philagro. Process for the preparation of 1-carbamoyl-3-(3,5-dichlorophenyl)-hydantoins. 4,076,941, Cl. 548-312.000.
Saunders, Frank L.; and Pelletier, Ronald R., to Dow Chemical Company, The. Cross-linked block copolymer blends with improved impact resistance. 4,076,768, Cl. 260-876.00B.
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Saxinger, Allan L., to Xerox Corporation. Slave drive for toner dispenser with striker. 4,076,149, Cl. 222-202.000.
Schaaphok, Peter R. W., to Controlex Corporation of America. Stabilized flexible remote control with spaced ball bearings. 4,075,905, Cl. 74-501.00R.
Schaefer, Robert H., to General Motors Corporation. Transmission with sump oil level responsive controls. 4,075,912, Cl. 74-867.000.
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Schaming, Edward J. Runout cooling method and apparatus for metal rolling mills. 4,076,222, Cl. 266-111.000.
Schaub, Robert Eugene; and Weiss, Martin Joseph, to American Cyanamid Company. Cycloalkyl and cycloalkenyl prostaglandin congeners. 4,076,947, Cl. 560-121.000.
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Schempp, Eberhard G., to Pennsylvania Engineering Corporation. Enclosure for steel converting apparatus. 4,076,223, Cl. 266-158.000.
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Scheurecker, Werner; and Kagerhuber, Franz, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Fastening arrangement for a longitudinally multiply divided roller to be used in continuous casting plants. 4,076,341, Cl. 308-20.000.
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Schibbye, Lauritz Benedictus: *See—*
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Schiferli, Johannes W., to U.S. Philips Corporation. Hot-gas reciprocating engine having controlled coupling of a combustion air fan. 4,075,844, Cl. 60-524.000.

Schimpf, James E.; and Shuler, Lucien B., to Caterpillar Tractor Co. Variable speed governor. 4,075,906, Cl. 74-513.000.
Schindling, Josef Franz, to Metallgesellschaft Aktiengesellschaft. Lock chamber for discharging dust. 4,076,044, Cl. 137-614.110.
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Schlei, Rudolf, to Braun Aktiengesellschaft. Control mechanism for a plurality of slide projectors. 4,076,399, Cl. 353-86.000.
Schlesinger, Sheldon Irwin; and Boszak, Ronald J., to American Can Company. Dry photopolymer imaging article having a diazonium salt and epoxide copolymer. 4,076,536, Cl. 96-75.000.
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Schmidt, Willi Johann, to Hoechst Aktiengesellschaft. Method of and apparatus for increasing the production output of stretched flat film webs composed of thermoplastic material. 4,076,785, Cl. 264-146.000.
Schmit, Justin M. Liquid container having a plastic film pouch and a piercing element to open the plastic film pouch. 4,076,147, Cl. 222-89.000.
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Scholten, John James; and Young, James Clinton, to General Filter Company. Baffle and wash trough assembly for granular-media filters. 4,076,625, Cl. 210-274.000.
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Schroeter, Siegfried H.; Bolon, Donald A.; and Lucas, Gary M., to General Electric Company. Method for coating photoflash lamps. 4,076,489, Cl. 431-94.000.
Schrolucke, Virgil H., to National Automatic Tool Company, Inc. Air bearing assembly for rotational table. 4,076,339, Cl. 308-9.000.
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Scott, John N., Jr.; and Carrow, Guy E., to Phillips Petroleum Company. Molded plastic article. 4,076,282, Cl. 285-156.000.
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Seha, Zdenek, to Ciba-Geigy AG. Process for the manufacture of aminoanthraquinones. 4,076,735, Cl. 260-378.000.
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Seki, Isao; Kitano, Noritoshi; and Kondo, Fusao, to Sankyo Company Limited. Preventive and curative compositions against mycoplasmosis. 4,076,814, Cl. 424-248.500.
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Shaw, Joseph Michael; and Zaininger, Karl Heinz, to RCA Corpora-

tion. Method of making planar silicon-on-sapphire composite. 4,076,573, Cl. 156-613.000.
Shea, Lawrence E. Resorcinol-aldehyde resins used to bind reinforcing materials such as glass fibers in shaped object form. 4,076,873, Cl. 428-35.000.
Shearer, James W.: *See*—
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Sheldon, Harold S., to Adjustable Clamp Company. Kerf clamp. 4,076,228, Cl. 269-49.000.
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Roman, Steven A.; and Powell, James E., 4,076,813, Cl. 424-246.000.
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Shields, James E., to Eli Lilly and Company. L-Val^{10}-somatostatin and intermediates thereto. 4,076,659, Cl. 260-8.000.
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Shimizu, Akihiko; and Kita, Atsushi, to Toyo Soda Manufacturing Co., Ltd. Process for producing sulfur modified polychloroprene. 4,076,927, Cl. 526-217.000.
Shinagawa Furnace Co., Ltd.: *See*—
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Shorette, Richard A. Light diffuser and illuminating ceiling display. 4,075,775, Cl. 40-553.000.
Short, Buddy M.; and Rayfield, Jerry W., to Masonite Corporation. Method of impregnating wood with boric acid. 4,076,871, Cl. 427-397.000.
Short, William T., to General Motors Corporation. Dual-walled microcapsules and a method of forming same. 4,076,774, Cl. 264-4.000.
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Sicurella, MariaRosa, to Cavalieri, Amilcare. Insole for footwears. 4,075,772, Cl. 36-43.000.
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Sigott, Siegfried; Zitz, Alfred; Althaler, Wilhelm; and Wlach, Helmut, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Device for consecutively supporting a drift. 4,075,856, Cl. 61-45.00C.
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Silvey, Trevor Ian, to Plessey Handel und Investments A.G. Hydrodynamic cable fairing. 4,075,967, Cl. 114-243.000.
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Simmons, Raymond W., to Concept Inc. Forceps spacing device. 4,076,028, Cl. 128-303.130.
Simms, John Alvin, to Du Pont de Nemours, E. I., and Company. Flexible thermosetting acrylic enamels. 4,076,766, Cl. 260-850.000.
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Singiser, Robert E.; Chun, Alexander Hing Chinn; and Mehta, Shashi Pal, to Abbott Laboratories. Erythromycin therapy. 4,076,804, Cl. 424-181.000.
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Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.
Sizer, Philip S., to Otis Engineering Corporation. Method and apparatus for controlling a well during drilling operations. 4,076,083, Cl. 175-65.000.
Sjogren, Charles Norman, to Global Marine, Inc. Ice melting system. 4,075,964, Cl. 114-40.000.
Sjovall, Jan Bertil: *See*—
Ellingboe, James; Nystrom, Ernst Holger; and Sjovall, Jan Bertil, 4,076,930, Cl. 536-1.000.
SKF Kugessagerfabriken GmbH: *See*—
Meinke, Peter; and Huber, Wolfgang, 4,076,340, Cl. 308-10.000.
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., to Standard Oil Company (Indiana). Downhole pump speed control. 4,076,457, Cl. 417-45.000.
Skriletz, Rudolph A., to Wallace-Murray Corporation. Method of restoring the fluid permeability of a used, ceramic fluid-release mold. 4,076,779, Cl. 264-39.000.
Slabon, Siegfried; and Franck, Klaus, to Wilkhahn, Wilkening & Hahne. Chair. 4,076,308, Cl. 297-313.000.
Slack, Peter: *See*—
Reginensi, Jean-Pierre; and Slack, Peter, 4,075,971, Cl. 115-41.00R.
Slade, Paul G.; and Wafer, John A., to Westinghouse Electric Corporation. Current limiting circuit interrupter. 4,077,025, Cl. 335-16.000.
Slade, Paul G.; and Wafer, John A., to Westinghouse Electric Corporation. Integral motor controller. 4,077,026, Cl. 335-195.000.

Slator, Damon T.; Peil, Archie W.; and Bishop, Thomas R., to Bowen Tools, Inc. Stress relieved tool elements. 4,076,436, Cl. 403-343.000.

Slaughter, Raymond Jeffrey, to BICC Limited. Optical transmission systems. 4,076,376, Cl. 350-96.210.

Sloan Valve Company: *See—*
Horowitz, Charles, 4,076,328, Cl. 303-50.000.

Smallcombe, Stephen H.: *See—*
Erwine, Barbara L.; and Smallcombe, Stephen H., 4,077,002, Cl. 324-0.5AH.

Smallegan, Jon M.: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,076,344, Cl. 308-72.000.

Smeaton, John Ronald, to Tioxide Group Limited. Apparatus and method for producing colored reproductions of black and white negatives. 4,076,413, Cl. 355-32.000.

Smidt, Fred A., Jr.; and Sprague, James A., to United States of America, Navy. Reduction in swelling of iron caused by irradiation. 4,076,524, Cl. 75-123.00J.

Smirne, Frank S. Apparatus for ejecting molded article. 4,076,483, Cl. 425-444.000.

Smirnov, Nikolai Nikolaevich: *See—*
Gromov, Jury Vasilievich; Leonov, Boris Ivanovich; Smirnov, Oleg Petrovich; Smirnov, Nikolai Nikolaevich; Nagornaya, Ljudmila Lavrentievna; and Zakharin, Yakov Abramovich, 4,076,984, Cl. 250-367.000.

Smirnov, Oleg Petrovich: *See—*
Gromov, Jury Vasilievich; Leonov, Boris Ivanovich; Smirnov, Oleg Petrovich; Smirnov, Nikolai Nikolaevich; Nagornaya, Ljudmila Lavrentievna; and Zakharin, Yakov Abramovich, 4,076,984, Cl. 250-367.000.

Smirnov, Rem Vasilievich: *See—*
Vitaliev, Georgy Viktorovich; Gvinepadze, Alexei Davidovich; Smirnov, Rem Vasilievich; and Sofiisky, Gury Dmitrievich, 4,077,029, Cl. 365-49.000.

Smith, Daniel J.: *See—*
Holt, Ronald; and Smith, Daniel J., 4,075,816, Cl. 53-74.000.

Smith, Ezra Thomas, to R. J. Reynolds Tobacco Company. Method for utilizing tobacco stems in smoking products. 4,076,030, Cl. 131-17.00R.

Smith, James D. B.: *See—*
Meier, Joseph F.; and Smith, James D. B., 4,076,626, Cl. 210-496.000.

Smith, Norman Alfred, to Ciba-Geigy AG. Process for crosslinking hydrophilic colloids with triazine compounds. 4,076,538, Cl. 96-11.000.

Smith, Oliver Wendell: *See—*
Koleske, Joseph Victor; and Smith, Oliver Wendell, 4,076,674, Cl. 260-29.4UA.

Smith, Ray E., to Velsicol Chemical Corporation. Emulsifiers for durable flame retardant textile finishes. 4,076,630, Cl. 252-8.100.

Smith, Robert L.; and Lee, Ta-Jyh, to Merck & Co., Inc. Crystalline dipilocarpinium pamoate. 4,076,942, Cl. 548-336.000.

Smith, Stanley E.: *See—*
Geller, Rodger E.; Smith, Stanley E.; and Wilson, Wayne A., 4,076,789, Cl. 264-259.000.

Smith, Thomas R. Decorative percussion rhythm instrument and noisemaker. 4,075,922, Cl. 84-402.000.

Smith, William Novis, to Foote Mineral Company. Process for the production of high purity alkali metal tetrahaloaluminates and products produced thereby. 4,076,794, Cl. 423-463.000.

SmithKline Corporation: *See—*
Maass, Alfred Roland, 4,076,839, Cl. 424-317.000.

Smiths Industries Limited: *See—*
Barlow, Alan, 4,076,353, Cl. 312-350.000.

Sneathen, James, Jr., to Raymond Lee Organization, Inc., The. Development board game apparatus. 4,076,249, Cl. 273-256.000.

Snow Brand Milk Products Co., Ltd.: *See—*
Kai, Fumindo; Kumazawa, Eitaro; and Ishioka, Yozo, 4,075,767, Cl. 34-92.000.

Sobolev, Igor: *See—*
Panusch, Erwin; Sobolev, Igor; and Carniglia, Stephen C., 4,076,580, Cl. 162-159.000.

Sochor, Jerzy R., to Elco Corporation. Transverse connector assembly method. 4,075,759, Cl. 29-629.000.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Bovo, Amilcare; and Valsecchi, Giuseppe, 4,076,966, Cl. 179-18.0BC.

Societe Alsa Clienne de Constructions Mecaniques de Mulhouse: *See—*
Ribeton, Jean Marie, 4,075,990, Cl. 123-119.00C.

Societe Anonyme des Etablissements Francois Salomon & Fils: *See—*
Salomon, Georges Pierre Joseph, 4,076,274, Cl. 280-605.000.

Societe de Recherches Techniques et Industrielles: *See—*
Mas, Louis, 4,076,609, Cl. 204-258.000.

Societe des Plastiques de Carmaux Scasar: *See—*
Pied, Jean-Philippe, 4,075,784, Cl. 47-9.000.

Societe Nationale Elf Aquitaine (Production): *See—*
Chateau, Georges M.; and Desai, Praful, 4,076,278, Cl. 285-18.000.

Societe Nationale Elf Aquitaine (Production) - SNEA(P): *See—*
Brossel, Maurice; Laurent, Gilbert; and Bertannier, Daniel, 4,076,885, Cl. 428-286.000.

Societe Suisse pour l'Industrie Horlogere Management Services S.A.: *See—*
Zumsteg, Alphonse E., 4,076,987, Cl. 310-361.000.

Sofiisky, Gury Dmitrievich: *See—*
Vitaliev, Georgy Viktorovich; Gvinepadze, Alexei Davidovich; Smirnov, Rem Vasilievich; and Sofiisky, Gury Dmitrievich, 4,077,029, Cl. 365-49.000.

Sokolow, Nickolas N., to Beloit Corporation. Shut-off valve for plastic melt injection. 4,076,485, Cl. 425-562.000.

Solvay & Cie.: *See—*
Brahm, Jacques; and Mulders, Julien, 4,076,643, Cl. 252-89.00R.

Somers, Jay G. Tire stud with anti-skid surface. 4,076,065, Cl. 152-210.000.

Somet Societa' Meccanica Tessile S.p.A.: *See—*
Merisio, Alberto, 4,076,054, Cl. 139-453.000.

Sommerfeld, Eugene G., to Du Pont de Nemours, E. I., and Company. Aqueous coating composition from aminoplast and reaction product of tertiary amine and polymer containing randomly distributed epoxy groups. 4,076,675, Cl. 260-29.4UA.

Sommerfeld, Eugene G., to Du Pont de Nemours, E. I., and Company. Aqueous coating composition from aminoplast and reaction product of tertiary amine and polymer containing terminal epoxy groups. 4,076,676, Cl. 260-29.40R.

Sony Corporation: *See—*
Morio, Minoru, 4,077,046, Cl. 358-4.000.
Yamagiwa, Kazuo, 4,077,047, Cl. 358-4.000.

Soschenko, Evgeny Maximovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; Chizhikov, Anatoly Petrovich; and Volyansky, Igor Igorievich. Air tight connection between pneumatically conveyed containers. 4,075,947, Cl. 104-23.0FS.

Sova, Stanley George: *See—*
Suskind, Stuart Paul; and Sova, Stanley George, 4,076,879, Cl. 428-113.000.

Sowards, Norman K., to Energy Products of Idaho. Low pollution incineration of solid waste. 4,075,953, Cl. 110-8.00F.

Sowders, Roger E. Ka-bob display. 4,076,116, Cl. 206-45.190.

Sowell, Miles L.: *See—*
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Sparks, Bryan D.: *See—*
Puddington, Ira E.; Sparks, Bryan D.; and Sexton, Ernest A., 4,076,578, Cl. 162-5.000.

Sparks, Robert A.; Rothbart, George B.; and Samdahl, Roger N., to Syntex (U.S.A.) Inc. Position sensitive area detector for use with X-ray diffractometer or X-ray camera. 4,076,981, Cl. 250-272.000.

Specht, Steven J.; and Adams, John O., to Olin Corporation. Method of bonding electrolytic diaphragms of perfluorosulfonic acid resins. 4,076,571, Cl. 156-305.000.

Spencer, Bette M.: *See—*
Light, Kenneth K.; Spencer, Bette M.; Vinals, Joaquin F.; Kiwala, Jacob; Vock, Manfred Hugo; and Shuster, Edward J., 4,076,854, Cl. 426-538.000.

Sperandeo, Frank P., III. Underwater recovery apparatus. 4,076,313, Cl. 299-8.000.

Sperner, Peter, to Clouth Gummiwerke Aktiengesellschaft. Elastic joint. 4,076,434, Cl. 403-224.000.

Sperry Rand Corporation: *See—*
Johnston, Ross W., 4,075,943, Cl. 101-93.480.
Rowland-Hill, Edward W., 4,075,823, Cl. 56-14.600.
Young, Robert G.; and Pucher, Richard A., 4,075,941, Cl. 100-19.00R.

Spielvogel, Harry, to Schloemann-Siemag Aktiengesellschaft. Hydrauiic valve. 4,076,210, Cl. 251-285.000.

Spontelli, Leonard P., to Crawford Fitting Co. Tube fitting. 4,076,286, Cl. 285-341.000.

Sprague, James A.: *See—*
Smidt, Fred A., Jr.; and Sprague, James A., 4,076,524, Cl. 75-123.00J.

Sprecker, Mark A.: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.

Spulgis, Ivars Sigurds; Pettit, Jack Leland; Allard, Michael Duane; and Parish, Harold Cheney, to Pennwalt Corporation. Methods for filling filter cells with adsorbent material. 4,076,057, Cl. 141-1.000.

Srocki, Sigismund Walter: *See—*
Kobeski, Walter Dan; Srocki, Sigismund Walter; Blosser, William Ivan; and Needham, James Joseph, 4,076,862, Cl. 427-136.000.

Stach, Kurt: *See—*
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.

Staedtler & UHL: *See—*
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Staheli, Paul, to Rieter Machine Works, Ltd. Method and apparatus for controlling a card. 4,075,739, Cl. 19-240.000.

Stahl, Donald P.: *See—*
Bybel, David; Furey, Richard F.; and Stahl, Donald P., 4,076,617, Cl. 210-19.000.

Stamatoff, Gelu Stoeff: *See—*
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Standard Oil Company, The: *See—*
Dolhyj, Serge R.; Milberger, Ernest C.; and White, James F., 4,076,731, Cl. 260-346.400.

Standard Oil Company (Indiana): *See—*
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., 4,076,457, Cl. 417-45.000.
Standley, Wendell Evert, to Abbott Laboratories. Spin welding apparatus. 4,075,820, Cl. 53-329.000.
Standun, Inc.: *See—*
Crago, Terril M., 4,075,963, Cl. 113-113.00R.
Stanek, Gary C.: *See—*
Lorenz, Leo J.; and Stanek, Gary C., 4,076,092, Cl. 180-68.00P.
Stargardter, Hans, to United Technologies Corporation. Rotor blade system for a gas turbine engine. 4,076,455, Cl. 416-191.000.
Stauffer Chemical Company: *See—*
McDonald, Harold, 4,076,650, Cl. 252-440.000.
Toy, Arthur D. F.; and Uhing, Eugene H., 4,076,746, Cl. 260-543.00P.
Steegmueller, Alfred: *See—*
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Steidl, Dieter: *See—*
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Steiner, Marcel Alfred: *See—*
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Steinke, Leo: *See—*
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Stendel, Wilhelm: *See—*
Lorenz, Walter, deceased; Hammann, Ingeborg; Homeyer, Bernhard; and Stendel, Wilhelm, 4,076,806, Cl. 424-200.000.
Stephens, William T., to Gresen Manufacturing Company. Hydraulic pump or motor. 4,075,933, Cl. 91-506.000.
Stern, Eric W.: *See—*
Abramovici, Miron; and Stern, Eric W., 4,076,762, Cl. 260-576.00R.
Stewart, Thomas; and Landau, Frederick W., to Rohm and Haas Company. Process for manufacture of alkyl esters of aliphatic carboxylic acids. 4,076,950, Cl. 560-218.000.
Stiles, Janice L.: *See—*
Foster, Gordon F.; Meissner, Helmuth E.; and Stiles, Janice L., 4,076,792, Cl. 423-213.500.
Stites, Harold W., to Armco Steel Corporation. Variable speed wire spooler. 4,076,182, Cl. 242-45.000.
Stol, Miroslav; Stoy, Vladimir; and Tuzar, Zdenek, to Ceskoslovenska akademie ved. Method of producing glycol methacrylate or glycol acrylate polymers and copolymers. 4,076,921, Cl. 526-89.000.
Stoncking, Richard D., to Essex Group, Inc. Ignition and control system for gas burning apparatus. 4,076,487, Cl. 431-25.000.
Stoner, Peter D.: *See—*
Gettleman, Ronald L.; and Stoner, Peter D., 4,076,349, Cl. 312-236.000.
Storm King Products, Inc.: *See—*
Wilson, William H., 4,075,863, Cl. 62-138.000.
Story, Alfred Donald, to Teepak, Inc. Method and device for everting tubular casings. 4,075,737, Cl. 17-45.000.
Stoss, Peter; and Satzinger, Gerhard, to Warner-Lambert Company. Certain dibenzothiacyclic-S-oximides. 4,076,723, Cl. 260-327.00B.
Stossel, Ernest. Fire extinguishing composition. 4,076,540, Cl. 106-15.0FP.
Stoy, Vladimir: *See—*
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Strauss, Edgar, to Ruti Machinery Works Ltd. Shed forming device on an undulated shed loom. 4,076,050, Cl. 139-436.000.
Strauss, Robert A.: *See—*
Payson, Buford L., 4,076,213, Cl. 254-60.000.
Street, Robert W.: *See—*
Herber, John F.; Richard, William R., Jr.; and Street, Robert W., 4,076,642, Cl. 252-78.500.
Streifer, William; Scifres, Donald R.; and Burnham, Robert D., to Xerox Corporation. Transverse mode control in double-heterostructure lasers utilizing substrate loss. 4,077,019, Cl. 331-94.50H.
Streisand, Kenneth, to Bell Telephone Laboratories, Incorporated. Method and apparatus for receiving disparate sequences of spaced tone bursts. 4,076,962, Cl. 179-6.30R.
Strewinsky, Rainer: *See—*
Ritter, Hans-Peter; Strewinsky, Rainer; Bulwien, Hans-Dieter; Koch, Engelbert; Bartholl, Hermann; and Hupp, Walter, 4,076,982, Cl. 250-288.000.
Strike, Donald P., to American Home Products Corporation. Prostaglandin derivatives. 4,076,730, Cl. 260-345.70P.
Strom, Richard Albert, to Control Data Corporation. Plasma display drive circuit and method. 4,077,033, Cl. 340-324.00M.
Stubbs, John K.: *See—*
Acheson, Richard M.; Cox, Ian R.; Stubbs, John K.; and Penrose, Alexander B., 4,076,817, Cl. 424-251.000.
Studiengesellschaft Kohle m.b.H.: *See—*
Wilke, Gunther; and Heimbach, Paul, 4,076,757, Cl. 260-611.00R.
Stultz, Peter Franklin: *See—*
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Sublistatic Holding SA: *See—*
Decombe, Robert; and Hugelin, Bernard, 4,076,495, Cl. 8-2.50A.
Subramanyan, Palliyil K.; Makowski, Mieczyslaw Paul; and Setele, Robert Joseph, to Gould Inc. Method of forming iron foil at high current densities. 4,076,597, Cl. 204-13.000.
Sudworth, James L.; and Bird, John M., to British Railways Board. Alkali metal-sulphur cells. 4,076,903, Cl. 429-104.000.
Sugimoto, Hirohiko: *See—*
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,702, Cl. 260-112.50R.
Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,703, Cl. 260-112.50R.
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Hirai, Kentaro; Ishiba, Teruyuki; Sasakura, Kazuyuki; and Sugimoto, Hirohiko, 4,076,705, Cl. 260-112.50R.
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Sullivan, Dwayne, to Lawrence Peska Associates Inc. Knock-down mobile picnic table and bench assembly. 4,076,305, Cl. 297-157.000.
Sullivan, Lawrence J. Chair lift apparatus. 4,075,719, Cl. 5-81.00R.
Sullivan, Paul E.: *See—*
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Sulzer Brothers Limited: *See—*
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Sumin, Iosif Grigorievich: *See—*
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Sumitomo Chemical Company, Limited: *See—*
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Sumner, Glen R., to HydroTech International, Inc. Apparatus for mounting a coupling member over a pipe end in a subsea location. 4,076,130, Cl. 214-1.0PA.
Sunday, Brooks R.: *See—*
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Sundeen, Joseph E.: *See—*
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Superior Concrete Accessories, Inc.: *See—*
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Sur, Mikhail Danilovich; and Dudko, Daniil Andreevich. Planetary air motor with two internal gearings. 4,076,470, Cl. 418-63.000.
Suskind, Stuart Paul; and Sova, Stanley George, to Inmont Corporation. Sheet material. 4,076,879, Cl. 428-113.000.
Sussex Plastics Engineering, Inc.: *See—*
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Suzuki, Akira: *See—*
Yukuta, Toshio; Ohashi, Takashi; Kojima, Minoru; and Suzuki, Akira, 4,076,654, Cl. 260-2.5AM.
Suzuki, Kunio: *See—*
Yazawa, Masahide; Kubo, Teruo; and Suzuki, Kunio, 4,076,782, Cl. 264-51.000.
Suzuki, Osamu: *See—*
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Suzuki, Shin; Matsumoto, Kazuo; and Nakaoka, Ichiro, to Kabushiki Kaisha Pollution Preventing Research Laboratory. Method of decomposing nitrogen oxide (NO_x). 4,076,606, Cl. 204-157.10R.
Suzuki, Shirou: *See—*
Murayama, Naohiro; Nakamura, Kenichi; Fukuda, Makoto; Sakagami, Teruo; and Suzuki, Shirou, 4,076,604, Cl. 204-98.000.
Suzuki, Shoji, to ALPS, Motorola, Inc. Control lever locking mechanism. 4,075,908, Cl. 74-527.000.
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Suzuki, Toshiyuki; and Yamauchi, Fumio, to Murakami Kaimedio Co., Ltd. Remotely controllable rear view mirror. 4,076,392, Cl. 350-289.000.
Svenska Rotor Maskiner Aktiebolag: *See—*
Persson, Walther; and Schibbye, Lauritz Benedictus, 4,076,468, Cl. 418-9.000.
Svensson, Einar Gustav Vilhelm. Wire cloth joint and a method and means for making the same. 4,075,740, Cl. 24-31.00B.
Swanson Engineering, Inc.: *See—*
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Swanson, Floyd R., Jr., to Swanson Engineering, Inc. Fluid pump for use in explosive bore holes. 4,076,466, Cl. 417-390.000.

Swartz, Henry D.: *See—*
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Sweetheart Plastics, Inc.: *See—*
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Sweger, Theodore J., to Illinois Railway Equipment Co. Hatch cover locking means. 4,076,290, Cl. 292-256.500.

Swenson, Paul F. Damper control apparatus. 4,076,171, Cl. 236-1.00G.

Swift, Graham; and Cenci, Harry J., to Rohm and Haas Company. Method for curing polymers containing one or more carboxy or anhydride functions and compositions. 4,076,917, Cl. 526-49.000.

Swithenbank, Colin: *See—*
Bayer, Horst O.; Swithenbank, Colin; and Yih, Roy Y., 4,076,741, Cl. 260-465.00F.

Syntex (U.S.A.) Inc.: *See—*
Kracklauer, John J., 4,076,657, Cl. 260-2.5AJ.
Lodewyk, Eric, 4,076,745, Cl. 260-526.00R.
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Szabo, Andras I.: *See—*
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T. J. Smith & Nephew Limited: *See—*
Fennimore, Jack; Ruder, Gary; and Simmonite, Donald, 4,076,892, Cl. 428-407.000.

Taccon, Danizzo; and Taccon, Gloriano. Atomizer. 4,076,173, Cl. 239-411.000.

Taccon, Gloriano: *See—*
Taccon, Danizzo; and Taccon, Gloriano, 4,076,173, Cl. 239-411.000.

Taft, Philip Augustus, to Girling Limited. Hydraulic flow control valve assemblies. 4,076,036, Cl. 137-118.000.

Taguchi, Tetsuya: *See—*
Tsunekawa, Tokuichi; and Taguchi, Tetsuya, 4,076,977, Cl. 250-206.000.

Tahara, Goro R.: *See—*
Lubarsky, Andre, Jr.; Warner, G. Scott; and Tahara, Goro R., 4,076,970, Cl. 179-175.20R.

Tahara Shoyei Kiko K.K.: *See—*
Koide, Sakae; Aoki, Shigeo; and Uematsu, Tetsutaro, 4,075,791, Cl. 51-142.000.

Taiko Optical Kyogyo Kumiai: *See—*
Nakamura, Iwao, 4,076,394, Cl. 351-153.000.

Takahama, Sho: *See—*
Igarashi, Shunkichi; Okano, Takeshi; Takahama, Sho; and Hakamata, Yoshio, 4,076,412, Cl. 355-28.000.

Takahashi, Akio: *See—*
Satoh, Akihiro; Takahashi, Akio; Masuda, Jun; Harada, Masato; and Yamada, Sadahiko, 4,076,922, Cl. 526-97.000.

Takahashi, Kiyoshi: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.

Takatsuru, Mitsuhiro: *See—*
Nakazato, Takashi; Sawada, Chikamitsu; Umino, Shigeyuki; and Takatsuru, Mitsuhiro, 4,075,850, Cl. 60-633.000.

Takeda, Keiji; Matsumoto, Kenji; Tamura, Hiroshi; Nagata, Masayoshi; and Tsuboi, Masayoshi, to Fuji Photo Film Co., Ltd. Dry photographic copying method for producing Te images. 4,076,530, Cl. 96-29.00R.

Takei, Toshihiro: *See—*
Kuwakado, Satosi; Kasagi, Takao; and Takei, Toshihiro, 4,076,277, Cl. 280-738.000.

Takeuchi, Ryoichi: *See—*
Hirayama, Yoshio; Ito, Kanichi; Takeuchi, Ryoichi; Nomoto, Masao; and Shiina, Tomoyuki, 4,076,177, Cl. 241-32.000.

Takigawa, Tomoshi: *See—*
Komine, Yoshio; Furukawa, Hiroshi; Takahashi, Kiyoshi; Takigawa, Tomoshi; Ogiso, Mitsutoshi; and Ichiyanagi, Toshikazu, 4,076,396, Cl. 352-29.000.

Takiron Co., Ltd.: *See—*
Yoshikawa, Yoshinobu; Iida, Kosuke; Morikawa, Tadayuki; and Satomi, Akinori, 4,076,567, Cl. 156-219.000.

Talmage, Peter Guy; and Kuehnle, Manfred Rudolf, to Coulter Information Systems, Inc. Method of and apparatus for toning electrophotographic film. 4,076,406, Cl. 355-10.000.

Tamai, Hideo: *See—*
Komura, Ikuo; Tamai, Hideo; and Morita, Takayuki, 4,075,919, Cl. 83-676.000.

Tamai, Yasuo: *See—*
Furukawa, Masahiko; Ogawa, Hiroshi; Aonuma, Masashi; Tamai, Yasuo; Nakahara, Hiromi; and Igarashi, Masaaki, 4,076,861, Cl. 427-132.000.

Tamaro, George John, to ICOS Corporation of America. Steel reinforced underground wall. 4,075,852, Cl. 61-35.000.

Tamburro, Peter James, to Bell Telephone Laboratories, Incorporated. Interconnection pin for multilayer printed circuit boards. 4,076,356, Cl. 339-17.00C.

Tamura, Hiroshi: *See—*
Takeda, Keiji; Matsumoto, Kenji; Tamura, Hiroshi; Nagata, Masayoshi; and Tsuboi, Masayoshi, 4,076,530, Cl. 96-29.00R.

Tani, Nobutaka: *See—*
Katayama, Kazuhiko; Nishigaki, Masahiko; Ohtani, Akira; Tani, Nobutaka; Nishizawa, Minoru; and Nakanishi, Hirokazu, 4,076,951, Cl. 526-62.000.

Tanimoto, Shinichi: *See—*
Nakatsuka, Ryuzo; Suzuki, Setsuo; Tanimoto, Shinichi; and Funatsu, Eiji, 4,076,846, Cl. 426-62.000.

Tanzen, Wilhelm, to Vereinigte Flugtechnische Werke - Fokker GmbH. Cellular structure plate. 4,076,877, Cl. 428-73.000.

Taormina, Anthony J.; Wyszynski, Artur; and Witek, Roman J., to Essex Group, Inc. Lamp socket for printed circuit. 4,076,358, Cl. 339-17.00D.

Tarnay, Denes: *See—*
Jenne, Frank, Jr.; and Tarnay, Denes, 4,076,143, Cl. 220-2.10R.

Tate, Takao: *See—*
Goto, Kenji; and Tate, Takao, 4,076,000, Cl. 123-191.00S.

Tateno, Kouichi: *See—*
Azuma, Tomisaburo; Ichimaru, Kazuto; Tateno, Kouichi; and Murakami, Takeru, 4,076,545, Cl. 423-544.000.

Tatra, narodni podnik: *See—*
Hanzelka, Lubomir; Vidlar, Josef; and Neuman, Ladislav, 4,076,298, Cl. 296-28.00R.

Taubert, Karl: *See—*
Schuster, Johann; and Taubert, Karl, 4,076,494, Cl. 8-2.50A.

Taulier, Hubert Henri Leon; and Brugeille, Gerard, to Electricite de France (Service National). Fuse and application of said fuse to the construction of an emergency shutdown system for a nuclear reactor. 4,076,587, Cl. 176-86.00R.

Tauschek, Max J.; and Michaels, William A., to TRW Inc. Valve rotator. 4,075,987, Cl. 123-90.300.

Tax, Hans. Rotary crane. 4,076,128, Cl. 212-48.000.

Taylor, David W.; and Peterson, Philip R., to General Motors Corporation. Wheel lock control circuit. 4,076,332, Cl. 303-97.000.

Taylor, Robert Morgan: *See—*
Connery, James Gerard; Muly, Emil Christopher; and Taylor, Robert Morgan, 4,076,596, Cl. 204-1.00T.

Taysom, Dell A.; Taysom, Larry D.; De Witt, Robert J.; and De Witt, Carl S., to Carroll S. Mohr. Mechanical earthworm harvester. 4,076,124, Cl. 209-75.000.

Taysom, Larry D.: *See—*
Taysom, Dell A.; Taysom, Larry D.; De Witt, Robert J.; and De Witt, Carl S., 4,076,124, Cl. 209-75.000.

Tazaki, Michiji. Water cooling jacket for fire. 4,075,798, Cl. 52-168.000.

Technal International S.A.: *See—*
Bos, Andre, 4,076,438, Cl. 403-402.000.

Technitron, Inc.: *See—*
Gee, Edwin, 4,076,974, Cl. 219-108.000.

Teepak, Inc.: *See—*
Martinek, Thomas W., 4,075,938, Cl. 9.3-84.0TW.
Story, Alfred Donald, 4,075,737, Cl. 17-45.000.

Teiser, Sidney; and Eliott, Floyd H., to Eliott, Floyd H.; and Eliott, Barbara Ann. Magnifying reading device and viewer. 4,076,391, Cl. 350-241.000.

Telecommunications Technology, Inc.: *See—*
Lubarsky, Andre, Jr.; Warner, G. Scott; and Tahara, Goro R., 4,076,970, Cl. 179-175.20R.

Terasaki, Syuuzi: *See—*
Sasaki, Tohru; Terasaki, Syuuzi; and Ichii, Takao, 4,076,889, Cl. 428-333.000.

Terra Tek, Inc.: *See—*
Barker, Lynn Marshall, 4,075,884, Cl. 73-91.000.

Texaco Inc.: *See—*
Arnold, Dan M.; Dowling, Donald J.; and Warren, Wayne F., 4,076,980, Cl. 250-270.000.
Mayer, Edward A.; and Plungis, Donald W., 4,075,994, Cl. 123-119.00A.
McGann, Rodney, 4,075,831, Cl. 60-39.050.
Pitts, Robert W., Jr., 4,077,022, Cl. 333-1.000.

Texas Instruments Incorporated: *See—*
Buss, Dennis D.; and Hewes, Charles Robert, 4,076,960, Cl. 179-1.0SA.
Kitagawa, Norihisa; and White, Lionel Stuart, Jr., 4,077,031, Cl. 365-205.000.

Th. Kieserling & Albrecht: *See—*
Schweer, Wilhelm, 4,075,914, Cl. 82-1.00C.

Thaw, Allan: *See—*
McSherry, Thomas W.; and Thaw, Allan, 4,075,924, Cl. 85-3.00R.

Theis, James V., Jr.; Davis, Lynn M.; and Moss, Donald H., to Hollymatic Corporation. Pressure gas engine. 4,076,449, Cl. 415-18.000.

Theno, Mark Henry, to Champion International Corporation. Transparent multi-layered film and processes therefor. 4,076,895, Cl. 428-516.000.

Therkildsen, Henry T., to Caterpillar Tractor Co. Winch drum hydraulic disconnect. 4,075,894, Cl. 74-15.690.

Thermo King Corporation: *See—*
Seipp, Ronald W., 4,075,867, Cl. 62-323.000.

Theurer, John; Beck, Orville F.; and Doherty, James T., to Nesters Housing Company, Inc. Modular housing system with part of the module serving as a shipping container for the remainder of the module. 4,075,814, Cl. 52-79.500.

Theysohn, Rainer; Wurmb, Rolf; Leutner, Bernd; and Schlimper, Hans-Ulrich, to BASF Aktiengesellschaft. Flameproof nylon molding compositions. 4,076,682, Cl. 260-37.00N.

Thiel, Max: *See—*
Kampe, Wolfgang; Stach, Kurt; Thiel, Max; Bartsch, Wolfgang; Dietmann, Karl; Roesch, Egon; and Schaumann, Wolfgang, 4,076,829, Cl. 424-274.000.

Thiele, Gerd: *See—*
Rameil, Wilfried; Schraudolph, Manfred; and Thiele, Gerd, 4,077,057, Cl. 361-386.000.

Thom, Karl-Friedrich; and Schliebs, Reinhard, to Bayer Aktiengesellschaft. Polysiloxane/polycarbodiimide copolymers. 4,076,763, Cl. 260-824.00R.

Thomas, Anthony. Theater structure. 4,075,795, Cl. 52-8.000.

Thomas & Betts Corporation: *See—*
Kuo, Ted L. C., 4,076,364, Cl. 339-103.00R.

Thomas J. Lipton, Inc.: *See—*
Johnson, Richard Shaw; and Potter, John Kenneth, 4,076,847, Cl. 426-78.000.

Thompson, Harris A. Positive pressure respiratory apparatus. 4,076,021, Cl. 128-145.600.

Thompson, Leroy R.: *See—*
Davis, Warren W.; and Thompson, Leroy R., 4,075,910, Cl. 74-785.000.

Thompson, Walter F.; and Redo, Dennis M., to General Cable Corporation. Bobbin transporting and storage system. 4,076,132, Cl. 214-16.40A.

Thomson-Brandt: *See—*
Metz, Pierre, 4,076,187, Cl. 244-3.230.

Thomson-CSF: *See—*
Deffayet, Jean; and Lamarque, Etienne, 4,075,946, Cl. 102-52.000.

Thorp, Peter M.: *See—*
Knight, Clifford; and Thorp, Peter M., 4,076,233, Cl. 271-233.000.

Thorpe, Ernest John, to Glacier Metal Company Limited, The. Bearings. 4,076,342, Cl. 308-36.000.

Thurn, Friedrich; Burmester, Kurt; Pochert, Johannes; and Wolff, Siegfried, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Reinforcing additive. 4,076,550, Cl. 106-288.00Q.

Thurston, David L.: *See—*
Adams, Cecil E.; Dillon, Leo H.; Born, Ellis H.; and Thurston, David L., 4,076,459, Cl. 417-217.000.

Thurston, Robert Norton: *See—*
Boyd, Gary Delane; and Thurston, Robert Norton, 4,077,023, Cl. 333-30.00R.

Thyberger, Filip Bertil; and Lindstrom, Kurt Olle Ragnvald, to Granges Essem Aktiebolag. Method of laying pipes or conduits in the ground and pipe arrangement produced thereby. 4,075,861, Cl. 61-105.000.

Tichy, Dieter: *See—*
Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, 4,076,662, Cl. 260-17.300.

Tick, Paul A.: *See—*
Kerko, David J.; and Tick, Paul A., 4,076,544, Cl. 106-54.000.

Tiethof, Jack A., to Engelhard Minerals & Chemicals Corporation. Hydrosulfite production. 4,076,795, Cl. 423-515.000.

Tighe, Robert E. Oriented drilling tool. 4,076,084, Cl. 175-73.000.

TII Corporation: *See—*
Bybel, David; Furey, Richard F.; and Stahl, Donald P., 4,076,617, Cl. 210-19.000.

Timusk, John: *See—*
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, 4,076,884, Cl. 428-255.000.

Tinholt, Thomas H., to Eaton Corporation. Quick disengagement viscous drive coupling. 4,076,110, Cl. 192-58.00B.

Tinnes, Bernhard, to Metacon AG. Plate structure for a liquid metal container closure. 4,076,153, Cl. 222-600.000.

Tinnes, Bernhard, to Metacon AG. Sealing means for the joint of a casting ladle closure. 4,076,154, Cl. 222-600.000.

Tioxide Group Limited: *See—*
Haigh, Harold Edward; and Hofmann, Dietrich Adolf, 4,076,200, Cl. 248-146.000.
Smeaton, John Ronald, 4,076,413, Cl. 355-32.000.

Todd, Edmond F. Inclined, vibrated, sifter and stratifier with gates. 4,076,614, Cl. 209-13.000.

Tokico Ltd.: *See—*
Aono, Masami, 4,076,105, Cl. 188-106.00A.
Nagase, Tosiro, 4,075,734, Cl. 16-58.000.

Tokuno, Masateru, to Rengo Co., Ltd. Board grouping apparatus. 4,076,114, Cl. 198-425.000.

Tokyo Boshi Kabushiki Kaisha: *See—*
Otake, Nobuyuki; Ando, Kozo; and Hori, Hironobu, 4,076,428, Cl. 401-265.000.

Tolan, Peter John, to B. F. Goodrich Company, The. Self-deploying boom. 4,076,624, Cl. 210-96.00R.

Tomioka, Shinji; and Mori, Yasuki, to Abbott Laboratories. Derivatives of an antibiotic XK-62-2 and the process for the production thereof. 4,076,931, Cl. 536-17.000.

Tompkins, Leo L., to Xenco, Inc. High efficiency natural convection heating and cooling system for home dwellings. 4,076,074, Cl. 165-53.000.

Topolyansky, Jury Arnoldovich: *See—*
Soschenko, Evgeny Maximovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; Chizhikov, Anatoly Petrovich; and Volyansky, Igor Igorievich, 4,075,947, Cl. 104-23.0FS.

Torrence, James D., to Allis-Chalmers Corporation. Gas distribution manifold arrangement and methods for use with plurality of hydropneumatic hydraulic accumulators. 4,076,176, Cl. 241-30.000.

Tovey, F. Michael: *See—*
Tree, Dennis Jack; and Tovey, F. Michael, 4,076,456, Cl. 416-241.00B.

Towmotor Corporation: *See—*
Sable, Frank Robert, 4,076,302, Cl. 296-65.00R.
Uhler, Douglas Lester, 4,076,195, Cl. 248-9.000.

Toy, Arthur D. F.; and Uhing, Eugene H., to Stauffer Chemical Company. Process for preparing dialkyl and diaryl phosphonothioic halides. 4,076,746, Cl. 260-543.00P.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Shimizu, Akihiko; and Kita, Atsushi, 4,076,927, Cl. 526-217.000.

Toyobo Co., Ltd.: *See—*
Yasuda, Hiroshi; and Omori, Susumu, 4,076,783, Cl. 264-78.000.

Toyota, Akinori; Odawara, Kiyoshi; and Kashiwa, Norio, to Mitsui Petrochemical Industries Ltd. Process for polymerization or copolymerizing olefins containing at least 3 carbon atoms. 4,076,924, Cl. 526-125.000.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Goto, Kenji; and Tate, Takao, 4,076,000, Cl. 123-191.00S.
Hanaoka, Masanori, 4,075,837, Cl. 60-282.000.
Kato, Takashi, 4,075,988, Cl. 123-97.00B.
Saito, Haruhiko; and Morishita, Michio, 4,076,770, Cl. 261-34.00A.

Transparent Glass Coatings Co., Inc.: *See—*
Gross, Marvin H.; and Kolb, Alfred, 4,075,802, Cl. 52-203.000.

Tree, Dennis Jack; and Tovey, F. Michael, to Garrett Corporation, The. Ceramic rotor for gas turbine engine. 4,076,456, Cl. 416-241.00B.

Trepka, William J., to Phillips Petroleum Company. Treatment of coupled polymers prior to hydrogenation. 4,076,915, Cl. 526-25.000.

Triangle Tool Company: *See—*
Schmidt, Fred, 4,075,897, Cl. 74-86.000.

Trinh, Stephane; Moraly, Alain; and Gaulliard, Jean-Michel, to Philagro S.A. Phosphite-based fungicide compositions. 4,076,807, Cl. 424-209.000.

Trudeau, William H.: *See—*
Gaines, Donald R.; Smallegan, Jon M.; and Trudeau, William H., 4,076,344, Cl. 308-72.000.

True Temper Corporation: *See—*
Germain, Robert A., 4,075,760, Cl. 30-220.000.

Trueblood, Inc.: *See—*
Trueblood, Raymond L., 4,076,475, Cl. 425-159.000.

Trueblood, Raymond L., to Trueblood, Inc. Pressure injection machine and method. 4,076,475, Cl. 425-159.000.

Trukhin, Alexandr Fedorovich: *See—*
Barannik, Ivan Andreevich; Kachurka, Alexandr Nikolaevich; Zharovsky, Ivan Vasilievich; Trukhin, Alexandr Fedorovich; Raskatov, Viktor Georgievich; and Mazurkevich, Alexandr Borisovich, 4,076,472, Cl. 425-8.000.

TRW Inc.: *See—*
Rameson, William W., 4,076,227, Cl. 269-25.000.
Tauschek, Max J.; and Michaels, William A., 4,075,987, Cl. 123-90.300.

Tschoop, Lincoln Paul; and Steiner, Marcel Alfred, to Coleman Company, Inc., The. Method of securing sheet metal to plastic. 4,075,751, Cl. 29-432.100.

Tseng, Ching Y.: *See—*
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.

Tsimbler, Jury Abramovich: *See—*
Soschenko, Evgeny Maximovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; Chizhikov, Anatoly Petrovich; and Volyansky, Igor Igorievich, 4,075,947, Cl. 104-23.0FS.

Tsu, Kin Hsueh-Yuan: *See—*
Matsuda, Ken; and Tsu, Kin Hsueh-Yuan, 4,076,747, Cl. 260-561.00N.

Tsuboi, Masayoshi, to Fuji Photo Film Co., Ltd. Light-sensitive materials containing organo tellurium or selenium compounds and sensitizers. 4,076,537, Cl. 96-88.000.

Tsuboi, Masayoshi: *See—*
Takeda, Keiji; Matsumoto, Kenji; Tamura, Hiroshi; Nagata, Masayoshi; and Tsuboi, Masayoshi, 4,076,530, Cl. 96-29.00R.

Tsuda, Yoshinao; Arita, Masafumi; Hamasaki, Toshio; Tsumagari, Tatsumi; and Kenjo, Takenori, to Yoshitomi Pharmaceutical Industries, Ltd. 4,4-Diphenylcycloalkylpiperidines and psychotropic compositions thereof. 4,076,821, Cl. 424-263.000.

Tsuji, Hideakira: *See—*
Murayama, Keisuke; Asai, Motoji; and Tsuji, Hideakira, 4,076,835, Cl. 424-285.000.

Tsuji, Nobuo; Ishige, Sadao; Miyamoto, Akio; and Kato, Hajime, to Fuji Photo Film Co., Ltd. Recording sheets. 4,076,887, Cl. 428-307.000.

Tsukube, Syozo, to Kabushiki Kaisha Sogo Pump Seisakusho. Centrifugal sewage pump. 4,076,179, Cl. 241-46.110.

Tsumagari, Tatsumi: *See—*
Tsuda, Yoshinao; Arita, Masafumi; Hamasaki, Toshio; Tsumagari, Tatsumi; and Kenjo, Takenori, 4,076,821, Cl. 424-263.000.

Tsunekawa, Tokuichi; and Taguchi, Tetsuya, to Canon Kabushiki Kaisha. Light measuring circuit with stray capacitance compensating means. 4,076,977, Cl. 250-206.000.

Tulbert, David J. Motion picture printing apparatus. 4,076,414, Cl. 355-38.000.

Tults, Juri: *See—*
Rast, Robert Morgan; and Tults, Juri, 4,077,008, Cl. 325-421.000.

Tunoda, Tutae. Method and apparatus for producing fine deodorized soybean powder. 4,076,851, Cl. 426-431.000.

Turbak, Albin Frank; Hammer, Richard Benjamin; Portnoy, Norman A.; and West, Arthur C., to International Telephone and Telegraph Corporation. Process for producing a regenerated shaped cellulosic fiber. 4,076,933, Cl. 536-30.000.

Turbak, Albin Frank: *See—*
Hammer, Richard Benjamin; Turbak, Albin Frank; Portnoy, Norman A.; and West, Arthur C., 4,076,932, Cl. 536-30.000.

Turchenko, Alexandr Vasilievich: *See—*
Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.

Turner, Robert B., to Dow Chemical Company, The. Rapid setting polyurethane elastomers and process of preparation. 4,076,679, Cl. 260-31.20N.

Tuzar, Zdenek: *See—*
Stol, Miroslav; Stoy, Vladimir; and Tuzar, Zdenek, 4,076,921, Cl. 526-89.000.

Tvorogov, Nikolai Nikandrovich: *See—*
Berlin, Alfred Anisimovich; Brikenshtein, Khaim-Mordkhe Aronovich; Gavrjushenko, Nikolai Sviridovich; Dubovitsky, Fedor Ivanovich; Kefeli, Tamara Yakovlevna; Kronman, Raisa Vasilievna; Konkhina, Ljudmila Alexeevna; Marshavina, Natalya Lvovna; Popova, Galina Leonidovna; Radugina, Anna Alexandrovna; Sivergin, Jury Mikhailovich; Sumin, Iosif Grigorievich; Tvorogov, Nikolai Nikandrovich; Shilova, Galina Pavlovna; and Kardashov, David Alexeevich, 4,076,742, Cl. 260-47.0UA.

Tybring, Leif, to Leo Pharmaceutical Products Ltd. A/S. Antibiotic mixture. 4,076,816, Cl. 424-251.000.

Tye, Dennis W., to Superior Concrete Accessories, Inc. Remotely operable mechanism for disconnecting a pickup unit from a tilt-up concrete wall slab. 4,075,913, Cl. 81-177.0UJ.

Tyler Corporation: *See—*
Hurst, Gerald L., 4,076,637, Cl. 252-26.000.

Tyler, Hugh J.; and Wolfe, Denis G., to Robertshaw Controls Company. Electrical furnace and parts therefor. 4,076,975, Cl. 219-483.000.

U and I Incorporated: *See—*
Farag, Souly Atalla; and Norman, Lloyd Wendell, 4,076,552, Cl. 127-50.000.

Ueda, Atsumi, to Aisin Seiki Kabushiki Kaisha. Hydraulic brake booster. 4,075,848, Cl. 60-548.000.

Ueda, Takeshi: *See—*
Koizumi, Kunihei; Ueda, Takeshi; and Otani, Tatu, 4,076,593, Cl. 201-39.000.

Uematsu, Tetsutaro: *See—*
Koide, Sakae; Aoki, Shigeo; and Uematsu, Tetsutaro, 4,075,791, Cl. 51-142.000.

Uhing, Eugene H.: *See—*
Toy, Arthur D. F.; and Uhing, Eugene H., 4,076,746, Cl. 260-543.00P.

Uhler, Douglas Lester, to Towmotor Corporation. Adjustable mounting assembly. 4,076,195, Cl. 248-9.000.

Umino, Shigeyuki: *See—*
Nakazato, Takashi; Sawada, Chikamitsu; Umino, Shigeyuki; and Takatsuru, Mitsuhiro, 4,075,850, Cl. 60-633.000.

Ungerboeck, Gottfried: *See—*
Csajka, Istvan Peter; and Ungerboeck, Gottfried, 4,077,021, Cl. 332-9.00R.

Uni-Cardan AG: *See—*
Petrzelka, Miloslav, 4,075,907, Cl. 74-523.000.

Union Camp Corporation: *See—*
Lawson, Neison E., 4,076,665, Cl. 260-22.0CB.

Union Carbide Corporation: *See—*
Koleske, Joseph Victor; and Smith, Oliver Wendell, 4,076,674, Cl. 260-29.4UA.
Meier, Joseph F.; and Smith, James D. B., 4,076,626, Cl. 210-496.000.
Rosen, Meyer Robert, 4,076,648, Cl. 252-358.000.

Union Oil Company of California: *See—*
Fenton, Donald M., 4,076,911, Cl. 526-11.100.

Uniroyal Limited: *See—*
Moore, Travis; and Niblock, Hugh David, 4,076,255, Cl. 273-226.000.

United Aircraft Products, Inc.: *See—*
Freshcorn, Ivan Gene, 4,076,164, Cl. 228-103.000.

United Centrifugal Pumps: *See—*
Ross, Robert R., 4,076,450, Cl. 415-197.000.

United States Gypsum Company: *See—*
Kobeski, Walter Dan; Srocki, Sigismund Walter; Blosser, William Ivan; and Needham, James Joseph, 4,076,862, Cl. 427-136.000.

United States of America
Air Force: *See—*
O'Brien, Edward F., 4,076,418, Cl. 355-104.000.
Peterson, Paul F., 4,075,929, Cl. 91-168.000.
Wennerstrom, Arthur J., 4,076,454, Cl. 415-208.000.
Army: *See—*
Robinson, Harold R., 4,075,983, Cl. 123-32.0EA.
Energy: *See—*
Gilson, Verle A.; Schriever, Richard L.; and Shearer, James W., 4,077,017, Cl. 331-94.5PE.
Golden, Martin P.; and Govi, Aldo R., 4,076,584, Cl. 176-36.00R.
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Bates, Richard L., 4,076,393, Cl. 350-318.000.
Bishop, Walton B., 4,077,005, Cl. 325-32.000.
Hammer, Jacob Meyer, 4,076,381, Cl. 350-96.140.
Murbach, Warren J.; and Adicoff, Arnold, 4,076,772, Cl. 264-2.000.
Smidt, Fred A., Jr.; and Sprague, James A., 4,076,524, Cl. 75-123.00J.

U.S. Philips Corporation: *See—*
Schiferli, Johannes W., 4,075,844, Cl. 60-524.000.
Weidner, Hans Jurgen; and Juttner, Willi, 4,076,352, Cl. 312-330.00R.

United Technologies Corporation: *See—*
Chouinard, Rene Joseph, 4,076,379, Cl. 350-96.220.
Jankot, Alan Lewis, 4,076,451, Cl. 415-217.000.
Stargardter. Hans, 4,076,455, Cl. 416-191.000.

Universal Construction Industries, Inc.: *See—*
Bette, Joseph A., 4,076,013, Cl. 126-270.000.

University of California, The Regents of the: *See—*
Brink, David L., 4,076,579, Cl. 162-53.000.

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Rinehart, Kenneth L., Jr.; Antosz, Frederick J.; and Sasaki, Kazuya, 4,076,725, Cl. 260-340.300.

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Hendry, George O.; Hilton, John L.; and Kim, Jinchoon, 4,076,990, Cl. 313-61.00S.

University of Southern California: *See—*
Whelan, James M., 4,076,486, Cl. 431-5.000.

University of Toronto, The Governing Council of the: *See—*
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, 4,076,884, Cl. 428-255.000.

UPEC Corporation: *See—*
Hedstrom, Robert E.; and Brown, Edmund W., 4,076,157, Cl. 224-42.10E.

Uphoff, Theodore C.: *See—*
Haller, George S.; and Uphoff, Theodore C., 4,076,217, Cl. 254-131.000.

Upjohn Company, The: *See—*
Nelson, Norman A., 4,076,750, Cl. 260-590.00C.
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Urban, Friedrich; Buechner, Oskar; Hartig, Ulrich; and Gropper, Hans, to BASF Aktiengesellschaft. Manufacture of ethylene polymers in a two-zone tubular reactor at pressure above 500 bars. 4,076,919, Cl. 526-64.000.

Valdsaar, Herbert, to Du Pont de Nemours, E. I., and Company. Transition metal carbide and boride abrasive particles. 4,076,506, Cl. 51-307.000.

Valles, Joel. Door security strut. 4,076,293, Cl. 292-338.000.

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Hardouin, Jean Claude Henri Raoul; and Vallette, Maurice Rene Jean, 4,076,713, Cl. 260-263.000.

Valmet Oy: *See—*
Koski, Erkki; Veijonen, Lassi; and Koponen, Martti, 4,075,768, Cl. 34-116.000.

Valsecchi, Giuseppe: *See—*
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Valutec AG: *See—*
Deucher, Conrad, 4,076,304, Cl. 297-45.000.

Van Kooten B.V.: *See—*
Schnell, Hans Gunther, 4,076,081, Cl. 173-137.000.

Van Delft, Andries; and Giacino, Christopher, to International Flavors & Fragrances Inc. Edible compositions having a meat flavor and processes for making same. 4,076,852, Cl. 426-533.000.

Vander Putten, Paul R., to Carnation Company. Method of preparing screens for screen printing. 4,076,535, Cl. 96-67.000.

Van Gasse, Rene L. E., to All Decostone, N.V. Ornamental design. 4,076,875, Cl. 428-44.000.

Van Gompel, James, to Brammall, Inc. Lock assembly. 4,075,877, Cl. 70-34.000.

Vanguard Plastics Ltd.: *See—*
Follows, James Samuel; and Bergen, Gerhard Stanley, 4,076,289, Cl. 292-226.000.

Van Haastert, Johannes A.: *See—*
Ryder, James H.; Brown, David C.; and Van Haastert, Johannes A., 4,075,714, Cl. 2-6.000.

Vanhoof, Pierre M.; and Clarebout, Pierre M., to A. Christiaens Societe Anonyme. Derivatives of 1,3-benzodioxole, the preparation and use thereof. 4,076,833, Cl. 424-282.000.

Vanhove, Henri C. J.: *See—*
Wijnhoven, Jan M. A.; Oancea, Alexandru; Vanhove, Henri C. J.; and Beets, Roland H. C., 4,076,276, Cl. 280-714.000.

van Zyl, Bernard. Container for safely retaining a living plant during transit and display. 4,075,786, Cl. 47-84.000.

Varian Associates, Inc.: *See—*
Erwine, Barbara L.; and Smallcombe, Stephen H., 4,077,002, Cl. 324-0.5AH.

Varta Batterie Aktiengesellschaft: *See—*
Backer, Karl-Heinrich; and Schlachta, Hermann, 4,076,908, Cl. 429-184.000.

Vartiak, Joseph F.; and Wortley, George E., to Nalco Chemical Company. Aquatic herbicides. 4,076,516, Cl. 71-66.000.

Vega Industries, Inc.: *See*—
Andrews, George M., 4,076,010, Cl. 126-120.000.

Vega, Mary-Louise, to American Cyanamid Company. Chemical lighting process and composition. 4,076,645, Cl. 252-188.3CL.

Veijonen, Lassi: *See*—
Koski, Erkki; Veijonen, Lassi; and Koponen, Martti, 4,075,768, Cl. 34-116.000.

Veil, Lutz Bodo: *See*—
De Maeyer, Leo C. M.; Rabl, Carl-Roland; Jovin, Thomas M.; Riesner, Detlev; Rigler, Rudolf; Veil, Lutz Bodo; and Lehrach, Hans, 4,076,420, Cl. 356-73.000.

Velsicol Chemical Corporation: *See*—
Smith, Ray E., 4,076,630, Cl. 252-8.100.

Velten, Wendelin: *See*—
Volgel, Gunter Melchior; and Velten, Wendelin, 4,076,174, Cl. 239-492.000.

Venot, Jean, to ASA S.A. Yarn heating device. 4,076,075, Cl. 165-105.000.

Ventura, Frank D., to Ideal Toy Corporation. Dough mold press. 4,076,476, Cl. 425-183.000.

Verde, Luigi. Process for the biological purification of sewage. 4,076,616, Cl. 210-17.000.

Verdier, Henri, to Compagnie Generale des Etablissements Michelin. Pneumatic tire. 4,076,066, Cl. 152-354.00R.

Vereinigte Flugtechnische Werke - Fokker GmbH: *See*—
Tanzen, Wilhelm, 4,076,877, Cl. 428-73.000.

Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See*—
Scheinecker, Alois; and Scheurecker, Werner, 4,076,069, Cl. 164-448.000.
Scheurecker, Werner; and Kagerhuber, Franz, 4,076,341, Cl. 308-20.000.
Sigott, Siegfried; Zitz, Alfred; Althaler, Wilhelm; and Wlach, Helmut, 4,075,856, Cl. 61-45.00C.
Zitz, Alfred; and Wrulich, Herwig, 4,076,317, Cl. 299-75.000.

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Viaud, Jean-Luc: *See*—
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Vidlar, Josef: *See*—
Hanzelka, Lubomir; Vidlar, Josef; and Neuman, Ladislav, 4,076,298, Cl. 296-28.00R.

Vigeant, George Henry, deceased: *See*—
Parsons, Stuart L.; and Vigeant, George Henry, deceased, 4,075,758, Cl. 29-628.000.

Vigeant, Mrs. George Henry, heir: *See*—
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Vigelius, Wolf-Dieter; Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. Dibenzyl glycolic acid derivatives. 4,076,937, Cl. 544-171.000.

Vinals, Joaquin: *See*—
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.

Vinals, Joaquin F.: *See*—
Light, Kenneth K.; Spencer, Bette M.; Vinals, Joaquin F.; Kiwala, Jacob; Vock, Manfred Hugo; and Shuster, Edward J., 4,076,854, Cl. 426-538.000.

Vinogradov, Alexandr Vasilievich: *See*—
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Vinogradova, Olga Vladimirovna: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

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Vock, Manfred Hugo: *See*—
Light, Kenneth K.; Sanders, James Milton; Vock, Manfred Hugo; Shuster, Edward J.; Vinals, Joaquin; Schreiber, William L.; Hall, John B.; Hruza, Denis E., Sr.; Kamath, Venkatesh; Mookherjee, Braja Dulal; Tseng, Ching Y.; and Sprecker, Mark A., 4,076,853, Cl. 426-538.000.
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Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., 4,076,823, Cl. 424-269.000.

Vojuta, Leonty Feofanovich: *See*—
Chuply, Vladimir Yakovlevich; Vojuta, Leonty Feofanovich; Kondratenko, Feofan Ilich; Poludnenko, Jury Zakharovich; Milach, Adam Arsentievich; Kobozev, Vladimir Nikolaevich; and Turchenko, Alexandr Vasilievich, 4,076,087, Cl. 175-334.000.

Volgel, Gunter Melchior; and Velten, Wendelin, to Aerosol Inventions & Developments S.A. Aid SA. Spray nozzle for dispensing containers. 4,076,174, Cl. 239-492.000.

Volkman, S. Alan. Electronic display apparatus. 4,077,032, Cl. 340-324.00R.

Volpi AG: *See*—
Moraschetti, Nando, 4,076,377, Cl. 350-96.250.

Volyansky, Igor Igorievich: *See*—
Soschenko, Evgeny Maximovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; Chizhikov, Anatoly Petrovich; and Volyansky, Igor Igorievich, 4,075,947, Cl. 104-23.0FS.

von Ey, Volker: *See*—
Wacker, Erich; Hofmann, Heinz; Kopp, Karl; Bauer, Hermann; von Ey, Volker; and Weiss, Franz, 4,075,934, Cl. 92-159.000.

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von Strandtmann, Max: *See*—
Connor, David T.; Young, Patricia A.; and von Strandtmann, Max, 4,076,729, Cl. 260-345.200.

von Strandtmann, Maximilian: *See*—
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,076,716, Cl. 260-288.0CE.
Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,076,720, Cl. 260-296.00R.
Connor, David T.; and von Strandtmann, Maximilian, 4,076,940, Cl. 542-447.000.

Vorobiev, Vladimir Dmitrievich: *See*—
Korshak, Vasily Vladimirovich; Gribova, Irina Alexandrovna; Krasnov, Alexandr Petrovich; Krongauz, Evgenia Semenovna; Berlin, Alla Markovna; Vinogradova, Olga Vladimirovna; Mamatsashvili, Georgy Viktorovich; Pavlova, Saga-Silviya Alexandrovna; Gribkova, Pelageya Nikolaevna; Bekasova, Nina Ivanovna; Komarova, Ljudmila Grigorievna; Vorobiev, Vladimir Dmitrievich; Vlasova, Irina Vladimirovna; and Vinogradov, Alexandr Vasilievich, 4,076,634, Cl. 252-12.000.

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Vossen, John Louis, Jr., to RCA Corporation. Video disc capacitive recording means with a conductive bilayer. 4,077,052, Cl. 358-128.000.

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Pippenger, John J., 4,076,462, Cl. 417-310.000.

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Hall, Stanley Darwin, 4,076,122, Cl. 206-460.000.
Mahl, Harry L., Jr.; and Clark, Franklin D., 4,076,773, Cl. 264-3.00E.

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Huber, Peter; Lampelzammer, Helga; Pirson, Ewald; and Wimmer, Franz, 4,076,672, Cl. 260-29.20M.
Roth, Michael; and Bosch, Erhard, 4,076,868, Cl. 427-348.000.
Wohlfarth, Ernst; Hechtl, Wolfgang; Matejcek, Klaus; and Kleinschwarzer, Adolf, 4,076,684, Cl. 260-37.0SB.

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Wade, Peter C.; Vogt, B. Richard; and Kissick, Thomas P., to E. R. Squibb & Sons, Inc. Triazolo-2,4-benzodiazepines. 4,076,823, Cl. 424-269.000.

Wafer, John A.: *See*—
Slade, Paul G.; and Wafer, John A., 4,077,025, Cl. 335-16.000.
Slade, Paul G.; and Wafer, John A., 4,077,026, Cl. 335-195.000.

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pany, The. Hypolipidemic 2-(3,5-di-tert-butyl-4-hydroxyphenyl)thio carboxamides. 4,076,841, Cl. 424-324.000.
Wako, Shoji, to Xerox Corporation. Optical memory having serially stocked hologram plates. 4,076,370, Cl. 350-3.750.
Waldron, Bradley C., to King Nutronics Corporation. Temperature calibration system. 4,075,882, Cl. 73-1.00F.
Walker, Brooks. Key actuated auxiliary door lock. 4,076,292, Cl. 292-262.000.
Walker, Brooks. Nested wheel assembly. 4,076,319, Cl. 301-1.000.
Walker, Derek; and Chapman, Philip Howard, to Glaxo Laboratories Limited. Solid or gel polymers containing a plurality of free hydrazone groups. 4,076,913, Cl. 526-19.000.
Walker, James. Therapeutic foot and leg protector. 4,076,022, Cl. 128-149.000.
Wallace-Murray Corporation: *See—*
Skriletz, Rudolph A., 4,076,779, Cl. 264-39.000.
Wallis, Bernard J. Lubricating means for gas-operated cylinders. 4,076,103, Cl. 184-25.000.
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Walters, Raymond Frederick: *See—*
Gross, Harvey Andrew; Frey, Harry Robert; Messner, John David; and Walters, Raymond Frederick, 4,076,426, Cl. 356-239.000.
Walton, Edward: *See—*
Christensen, Burton A.; Morin, Robert B.; and Walton, Edward, 4,076,826, Cl. 424-272.000.
Waly, Adnan, to Izon Corporation. Microrecord having mirror-images. 4,076,415, Cl. 355-45.000.
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Ren, Chung-Li; and Wang, Han-Chiu, 4,077,039, Cl. 343-786.000.
Ward, Dennis Charles, to B & W Loudspeakers Limited. Loudspeaker diaphragm. 4,076,098, Cl. 181-170.000.
Wardell, Myron Henry, Jr.; and Marks, Bruce George, to RCA Corporation. High voltage electron tube base with separate dielectric fill-hole. 4,076,366, Cl. 339-144.00T.
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Connor, David T.; Young, Patricia A.; and von Strandtmann, Maximilian, 4,076,716, Cl. 260-288.0CE.
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Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,076,722, Cl. 260-307.00H.
Schwender, Charles F.; and Sunday, Brooks R., 4,076,710, Cl. 260-256.40F.
Stoss, Peter; and Satzinger, Gerhard, 4,076,723, Cl. 260-327.00B.
Vigelius, Wolf-Dieter; Satzinger, Gerhard; and Herrmann, Manfred, 4,076,937, Cl. 544-171.000.
Warren, Wayne F.: *See—*
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Wason, Satish K., to J. M. Huber Corporation. Amorphous precipitated siliceous pigments for cosmetic or dentifrice use and methods for their preparation. 4,076,549, Cl. 106-288.00B.
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Watson, Richard D., to General Motors Corporation. Housing and stator assembly for a dynamoelectric machine. 4,076,989, Cl. 310-89.000.
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Meldner, Volker Otto, 4,075,855, Cl. 61-45.00R.
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Weaver, Lester C., to Shakespeare of Arkansas, Inc. Transom mount for fishing motor. 4,076,193, Cl. 248-4.000.
Weaver, Richard L. Silo unloader blades. 4,076,133, Cl. 214-17.0DA.
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Weidner, Hans Jurgen; and Juttner, Willi, to U.S. Philips Corporation. Sliding drawer. 4,076,352, Cl. 312-330.00R.
Weihe, Clyde R. Apparatus and method for displaying the cost of operation of a commercial dishwashing machine. 4,076,554, Cl. 134-10.000.
Weir, John D.: *See—*
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Weir, W. David; and Kilbourn, Edward E., to Rohm and Haas Company. Phosphonoureide and phosphonothioureide anthelmintics. 4,076,809, Cl. 424-211.000.
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Weiss, Martin Joseph: *See—*
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Welczer, Mordechai. Wave motor. 4,076,463, Cl. 417-331.000.
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Norby, Llaney C., 4,076,878, Cl. 428-90.000.
Western Electric Co., Inc.: *See—*
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Mracek, Jaroslav; and Paek, Un-Chul, 4,076,510, Cl. 65-3.00A.
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Heller, Robert I.; Schafer, Larry C.; and McCracken, Stephen R., 4,077,038, Cl. 343-7.00A.
Johnston, Paul M.; and Szabo, Andras I., 4,077,061, Cl. 364-483.000.
Litz, Donald C., 4,076,988, Cl. 310-52.000.
Raimondi, Albert A., 4,076,259, Cl. 277-3.000.
Slade, Paul G.; and Wafer, John A., 4,077,025, Cl. 335-16.000.
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B 64,868	3,914,141	Oct. 21, 1975	B 288,018	3,925,239	Dec. 9, 1975
B 78,331	3,914,142	Oct. 21, 1975	B 288,627	3,916,179	Oct. 28, 1975
B 112,422	3,913,484	Oct. 21, 1975	B 288,638	3,925,132	Dec. 9, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 289,175	3,924,309	Dec. 9, 1975
B 176,995	3,915,773	Oct. 28, 1975	B 289,471	3,917,184	Nov. 4, 1975
B 178,475	3,944,602	Mar. 16, 1976	B 289,523	3,921,166	Nov. 18, 1975
B 189,772	3,925,367	Dec. 9, 1975	B 289,883	3,925,063	Dec. 9, 1975
B 189,773	3,925,405	Dec. 9, 1975	B 290,328	3,924,838	Dec. 9, 1975
B 190,679	3,925,346	Dec. 9, 1975	B 291,104	3,925,007	Dec. 9, 1975
B 198,810	3,916,043	Oct. 28, 1975	B 291,694	3,925,339	Dec. 9, 1975
B 204,161	3,924,605	Dec. 9, 1975	B 292,054	3,915,877	Oct. 28, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 292,126	3,914,465	Oct. 21, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 292,140	3,914,340	Oct. 21, 1975
B 213,211	3,925,269	Dec. 9, 1975	B 292,300	3,927,167	Dec. 16, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 292,563	3,923,653	Dec. 2, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 293,378	3,923,725	Dec. 2, 1975
B 223,621	3,925,526	Dec. 9, 1975	B 293,437	3,913,414	Oct. 21, 1975
B 224,323	3,925,476	Dec. 9, 1975	B 294,103	3,924,396	Dec. 9, 1975
B 233,383	3,925,424	Dec. 9, 1975	B 294,579	3,916,737	Nov. 4, 1975
B 233,741	3,925,326	Dec. 9, 1975	B 294,673	3,916,023	Oct. 28, 1975
B 235,011	3,925,086	Dec. 9, 1975	B 295,481	3,921,593	Nov. 25, 1975
B 235,925	3,924,949	Dec. 9, 1975	B 295,674	3,916,107	Oct. 28, 1975
B 236,609	3,925,187	Dec. 9, 1975	B 295,860	3,923,880	Dec. 2, 1975
B 237,953	3,924,051	Dec. 2, 1975	B 299,267	3,917,106	Nov. 4, 1975
B 239,289	3,922,711	Nov. 25, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,655	3,924,642	Dec. 9,1975
B 258,687	3,914,221	Oct. 21, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,599	3,925,323	Dec. 9, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 265,369	3,925,245	Dec. 9, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,727	3,914,479	Oct. 21, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 311,977	3,925,233	Dec. 9,1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,029	4,072,769	Jan. 28, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 313,594	3,924,626	Dec. 9, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 313,900	3,915,932	Oct. 28, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,049	3,920,588	Nov. 18, 1975
B 278,591	3,914,469	Oct. 21, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,390	3,924,576	Dec. 9,1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,239	3,913,546	Oct. 21, 1975
B 283,124	3,923,512	Dec. 2, 1975	B 316,422	4,016,206	Apr. 19, 1977
B 283,300	3,925,011	Dec. 9, 1975	B 316,917	3,925,494	Dec. 9, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 317,347	3,923,552	Dec. 2, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 317,624	3,925,167	Dec. 9, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 318,122	4,026,905	May 31, 1977
B 286,499	3,914,129	Oct. 21, 1975	B 318,195	3,915,699	Oct. 28, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,226	3,925,082	Dec. 9, 1975

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DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 319,339	3,916,056	Oct. 28, 1975	B 344,479	3,924,042	Dec. 2, 1975
B 319,402	3,919,568	Nov. 11, 1975	B 345,060	3,916,018	Oct. 28, 1975
B 319,414	3,928,666	Dec. 23, 1975	B 345,384	3,916,146	Oct. 28, 1975
B 320,261	3,924,033	Dec. 2, 1975	B 345,390	3,940,343	Feb. 24, 1976
B 320,452	3,925,083	Dec. 9, 1975	B 345,422	3,914,392	Oct. 21, 1975
B 320,603	3,915,571	Oct. 28, 1975	B 345,527	3,927,365	Dec. 16, 1975
B 321,018	3,921,623	Nov. 25, 1975	B 345,567	3,913,985	Oct. 21, 1975
B 321,101	3,917,163	Nov. 4, 1975	B 346,044	3,988,405	Oct. 26, 1976
B 321,938	3,923,889	Dec. 2, 1975	B 346,145	3,913,293	Oct. 21, 1975
B 322,182	3,925,390	Dec. 9, 1975	B 346,210	3,916,142	Oct. 28, 1975
B 322,239	3,920,973	Nov. 18, 1975	B 346,350	3,915,824	Oct. 28, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 346,487	3,927,406	Dec. 16, 1975
B 322,621	3,920,863	Nov. 18,1975	B 346,585	3,913,820	Oct. 21, 1975
B 322,777	3,924,382	Dec. 9, 1975	B 346,613	3,923,545	Dec. 2, 1975
B 323,127	3,923,967	Dec. 2, 1975	B 346,901	3,915,583	Oct. 28, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 348,083	3,923,774	Dec. 2, 1975
B 323,203	3,916,165	Oct. 28, 1975	B 348,383	3,923,452	Dec. 2, 1975
B 323,568	3,920,536	Nov. 18, 1975	B 348,495	3,914,654	Oct. 21, 1975
B 323,666	3,924,568	Dec. 9, 1975	B 348,558	3,914,109	Oct. 21, 1975
B 324,495	3,928,664	Dec. 23, 1975	B 349,141	3,915,363	Oct. 28, 1975
B 324,503	3,928,524	Dec. 23, 1975	B 349,177	3,914,033	Oct. 21, 1975
B 324,505	3,925,294	Dec. 9, 1975	B 349,231	3,915,831	Oct. 28, 1975
B 324,739	3,924,990	Dec. 9, 1975	B 349,321	3,916,103	Oct. 28, 1975
B 324,879	3,923,538	Dec. 2, 1975	B 349,948	3,914,557	Oct. 21, 1975
B 325,102	3,924,355	Dec. 9, 1975	B 350,025	3,927,415	Dec. 16, 1975
B 325,261	3,921,304	Nov. 25,1975	B 350,143	3,924,419	Dec. 9, 1975
B 326,514	3,925,080	Dec. 9, 1975	B 350,219	3,917,802	Nov. 4, 1975
B 327,109	3,925,350	Dec. 9, 1975	B 350,245	3,914,331	Oct. 21, 1975
B 327,363	3,923,504	Dec. 2, 1975	B 350,523	3,924,726	Dec. 9, 1975
B 327,612	3,925,620	Dec. 9, 1975	B 350,589	3,927,419	Dec. 16, 1975
B 327,674	3,918,540	Nov. 11, 1975	B 350,708	3,923,871	Dec. 2, 1975
B 327,899	3,925,674	Dec. 9, 1975	B 350,843	3,915,461	Oct. 28, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 351,055	3,914,074	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975	B 351,218	3,914,186	Oct. 21, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 351,222	3,921,179	Nov. 18, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 351,348	3,923,563	Dec. 2, 1975
B 328,391	4,039,888	Aug. 2, 1977	B 351,421	3,914,733	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975	B 351,493	3,914,758	Oct. 21, 1975
B 329,115	3,924,727	Dec. 9, 1975	B 351,535	3,915,239	Oct. 28, 1975
B 329,476	3,920,562	Nov. 18, 1975	B 351,665	3,919,701	Nov. 11, 1975
B 329,612	3,925,128	Dec. 9, 1975	B 351,672	3,914,000	Oct. 21, 1975
B 329,787	3,920,688	Nov. 18, 1975	B 351,673	4,076,529	Jan. 28, 1975
B 329,816	3,923,947	Dec. 2, 1975	B 351,735	3,913,385	Oct. 21, 1975
B 330,536	3,925,452	Dec. 9, 1975	B 351,863	3,914,700	Oct. 21, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 351,883	3,924,657	Dec. 9, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 351,926	3,914,133	Oct. 21, 1975
B 331,557	3,916,577	Nov. 4, 1975	B 351,939	3,913,480	Oct. 21, 1975
B 331,895	3,916,403	Oct. 28, 1975	B 352,445	3,928,746	Dec. 23, 1975
B 332,527	3,924,017	Dec. 2, 1975	B 352,934	3,913,692	Oct. 21, 1975
B 332,811	3,924,359	Dec. 9, 1975	B 352,950	3,922,590	Nov. 25, 1975
B 333,876	3,921,208	Nov. 18, 1975	B 352,965	3,921,926	Nov. 25, 1975
B 333,928	3,927,172	Dec. 16, 1975	B 353,317	3,916,446	Nov. 4, 1975
B 334,251	3,924,719	Dec. 9, 1975	B 353,387	3,924,404	Dec. 9, 1975
B 334,868	3,919,469	Nov. 11, 1975	B 353,546	3,913,273	Oct. 21, 1975
B 334,985	3,923,912	Dec. 2, 1975	B 354,008	3,925,081	Dec. 9, 1975
B 335,670	3,928,686	Dec. 23, 1975	B 354,098	3,925,547	Dec. 9, 1975
B 335,741	3,925,615	Dec. 9, 1975	B 354,145	3,927,279	Dec. 16, 1975
B 335,773	3,920,953	Nov. 18, 1975	B 354,296	3,914,580	Oct. 21, 1975
B 336,129	3,923,606	Dec. 2, 1975	B 354,510	3,928,658	Dec. 23, 1975
B 336,243	3,925,422	Dec. 9, 1975	B 354,889	3,913,204	Oct. 21, 1975
B 336,345	3,925,179	Dec. 9, 1975	B 354,979	3,914,251	Oct. 21, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 355,095	3,925,656	Dec. 9, 1975
B 336,902	3,918,897	Nov. 11, 1975	B 355,269	3,914,561	Oct. 21, 1975
B 336,946	3,919,425	Nov. 11, 1975	B 355,510	3,913,704	Oct. 21, 1975
B 336,978	3,923,968	Dec. 2, 1975	B 355,595	3,925,649	Dec. 9, 1975
B 337,235	3,919,386	Nov. 11, 1975	B 355,876	3,925,685	Dec. 9, 1975
B 337,409	3,925,258	Dec. 9, 1975	B 356,032	3,928,636	Dec. 23, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 356,253	3,925,025	Dec. 9, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 356,602	3,927,393	Dec. 16, 1975
B 337,787	3,923,506	Dec. 2, 1975	B 356,724	3,924,586	Dec. 9, 1975
B 339,059	3,924,822	Dec. 9, 1975	B 357,039	3,924,406	Dec. 9, 1975
B 339,218	3,925,121	Dec. 9, 1975	B 357,057	3,913,738	Oct. 21, 1975
B 339,699	3,933,527	Jan. 20, 1976	B 357,131	3,924,453	Dec. 9, 1975
B 339,838	3,930,221	Dec. 30, 1975	B 357,402	3,914,180	Oct. 21, 1975
B 340,212	3,922,645	Nov. 25, 1975	B 357,682	3,924,973	Dec. 9, 1975
B 340,833	3,925,208	Dec. 9, 1975	B 357,803	3,919,470	Nov. 11, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 358,174	3,924,958	Dec. 9, 1975
B 342,084	3,928,694	Dec. 23, 1975	B 358,244	3,913,411	Oct. 21, 1975
B 342,423	3,925,334	Dec. 9, 1975	B 358,311	3,923,561	Dec. 2, 1975
B 342,763	4,051,920	Oct. 4, 1977	B 358,939	3,924,713	Dec. 9, 1975
B 342,886	3,923,507	Dec. 2, 1975	B 359,174	3,914,117	Oct. 21, 1975
B 343,136	3,919,453	Nov. 11, 1975	B 359,187	3,924,525	Dec. 9, 1975
B 343,240	3,925,693	Dec. 9, 1975	B 359,540	3,915,235	Oct. 28, 1975
B 343,506	3,916,021	Oct. 28, 1975	B 359,740	3,936,212	Feb. 3, 1976
B 343,577	3,921,165	Nov. 18, 1975	B 359,791	3,929,430	Dec. 30, 1975
B 344,203	3,928,719	Dec. 23, 1975	B 359,825	3,921,344	Nov. 25, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 359,946	3,914,132	Oct. 21, 1975
B 359,947	3,914,653	Oct. 21, 1975
B 360,208	3,923,750	Dec. 2, 1975
B 360,296	3,916,720	Nov. 4, 1975
B 360,719	3,915,715	Oct. 28, 1975
B 360,910	3,925,696	Dec. 9, 1975
B 361,265	3,923,569	Dec. 2, 1975
B 361,347	3,914,642	Oct. 21, 1975
B 361,443	3,927,405	Dec. 16, 1975
B 361,569	3,914,554	Oct. 21, 1975
B 361,604	3,922,702	Nov. 25, 1975
B 361,734	3,915,764	Oct. 28, 1975
B 361,743	4,035,255	July 12, 1977
B 361,744	4,035,254	July 12, 1977
B 362,589	3,914,012	Oct. 21, 1975
B 363,205	3,923,744	Dec. 2, 1975
B 363,337	3,928,639	Dec. 23, 1975
B 363,457	3,922,595	Nov. 25, 1975
B 363,674	3,929,716	Dec. 30, 1975
B 363,892	3,913,395	Oct. 21, 1975
B 363,962	3,921,826	Nov. 25, 1975
B 364,022	3,913,499	Oct. 21, 1975
B 364,163	3,916,092	Oct. 28, 1975
B 364,241	3,916,668	Nov. 4, 1975
B 364,334	3,924,670	Dec. 9, 1975
B 364,528	3,919,510	Nov. 11, 1975
B 364,786	3,921,673	Nov. 25, 1975
B 364,910	3,925,335	Dec. 9, 1975
B 365,371	3,988,181	Oct. 26, 1976
B 365,490	3,918,527	Nov. 11, 1975
B 365,834	3,914,702	Oct. 21, 1975
B 365,841	3,925,628	Dec. 9, 1975
B 365,855	3,917,258	Nov. 4, 1975
B 366,287	3,924,946	Dec. 9, 1975
B 366,402	3,928,053	Dec. 23, 1975
B 366,589	3,914,719	Oct. 21, 1975
B 367,021	3,914,752	Oct. 21, 1975
B 367,040	3,924,775	Dec. 9, 1975
B 367,661	3,914,158	Oct. 21, 1975
B 367,739	3,923,648	Dec. 2, 1975
B 367,812	3,924,789	Dec. 9, 1975
B 368,081	3,924,691	Dec. 9, 1975
B 368,387	3,924,923	Dec. 9, 1975
B 368,392	3,913,812	Oct. 21, 1975
B 368,397	3,914,677	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975
B 369,563	3,924,449	Dec. 9, 1975
B 369,607	3,923,786	Dec. 2, 1975
B 369,997	3,913,533	Oct. 21, 1975
B 370,453	3,964,101	Jun. 15, 1976
B 370,706	3,925,242	Dec. 9, 1975
B 371,073	3,930,135	Dec. 30, 1975
B 371,085	3,923,783	Dec. 2, 1975
B 371,787	3,921,217	Nov. 18, 1975
B 371,805	3,914,433	Oct. 21, 1975
B 371,836	3,923,541	Dec. 2, 1975
B 372,823	3,924,660	Dec. 9, 1975
B 373,051	3,914,162	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975
B 373,326	3,920,433	Nov. 18, 1975
B 373,428	3,915,511	Oct. 28, 1975
B 375,220	3,920,417	Nov. 18, 1975
B 375,652	3,921,303	Nov. 25, 1975
B 376,504	3,914,570	Oct. 21, 1975
B 376,654	3,922,513	Nov. 25, 1975
B 376,742	3,924,392	Dec. 9, 1975
B 376,799	3,913,955	Oct. 21, 1975
B 377,172	3,918,255	Nov. 11, 1975
B 377,683	3,924,433	Dec. 9, 1975
B 377,833	3,913,884	Oct. 21, 1975
B 377,869	3,917,002	Nov. 4, 1975
B 378,621	3,923,840	Dec. 2, 1975
B 379,038	3,923,994	Dec. 2, 1975
B 379,172	3,914,379	Oct. 21, 1975
B 379,282	3,913,462	Oct. 21, 1975
B 379,955	3,913,157	Oct. 21, 1975
B 380,014	3,921,915	Nov. 25, 1975
B 380,141	3,925,161	Dec. 9, 1975
B 380,210	3,921,048	Nov. 18, 1975
B 380,312	3,913,953	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975
B 380,446	3,923,836	Dec. 2, 1975
B 380,900	3,913,307	Oct. 21, 1975
B 380,926	3,925,095	Dec. 9, 1975
B 381,074	3,919,583	Nov. 11, 1975
B 381,632	3,914,732	Oct. 21, 1975
B 381,847	3,921,152	Nov. 18, 1975
B 382,018	3,929,742	Dec. 30, 1975
B 382,021	3,913,212	Oct. 21, 1975
B 382,261	3,914,991	Oct. 28, 1975
B 382,290	3,924,717	Dec. 9, 1975
B 382,783	3,919,527	Nov. 11, 1975
B 382,798	3,924,435	Dec. 9, 1975
B 382,840	3,922,007	Nov. 25, 1975
B 383,465	3,927,412	Dec. 16, 1975
B 383,581	3,925,318	Dec. 9, 1975
B 383,852	3,914,246	Oct. 21, 1975
B 384,499	3,925,135	Dec. 9, 1975
B 384,658	3,913,452	Oct. 21, 1975
B 384,773	3,915,416	Oct. 28, 1975
B 385,210	3,913,406	Oct. 21, 1975
B 386,403	3,924,895	Dec. 9, 1975
B 386,592	3,925,305	Dec. 9, 1975
B 387,039	3,924,510	Dec. 9, 1975
B 387,331	3,913,701	Oct. 21, 1975
B 387,363	3,927,378	Dec. 16, 1975
B 387,687	3,918,151	Nov. 11, 1975
B 387,761	3,914,245	Oct. 21, 1975
B 387,790	3,925,380	Dec. 9, 1975
B 387,818	3,918,935	Nov. 11, 1975
B 388,580	3,923,712	Dec. 2, 1975
B 389,070	3,914,171	Oct. 21, 1975
B 389,295	3,914,631	Oct. 21, 1975
B 389,327	3,924,504	Dec. 9, 1975
B 389,639	3,914,626	Oct. 21, 1975
B 389,726	3,921,010	Nov. 18, 1975
B 389,807	3,922,623	Nov. 25, 1975
B 389,932	3,913,268	Oct. 21, 1975
B 389,933	3,913,267	Oct. 21, 1975
B 390,679	3,913,668	Oct. 21, 1975
B 390,732	3,913,878	Oct. 21, 1975
B 390,738	4,035,343	July 12, 1977
B 391,184	3,914,214	Oct. 21, 1975
B 391,210	3,914,220	Oct. 21, 1975
B 391,437	3,915,416	Oct. 28, 1975
B 391,509	3,925,175	Dec. 9, 1975
B 391,675	3,916,017	Oct. 28, 1975
B 392,154	3,923,809	Dec. 2, 1975
B 392,242	3,926,636	Dec. 16, 1975
B 392,696	3,916,175	Oct. 28, 1975
B 392,732	3,914,903	Oct. 21, 1975
B 392,753	3,916,341	Oct. 28, 1975
B 392,894	3,914,763	Oct. 21, 1975
B 393,163	3,914,535	Oct. 21, 1975
B 393,347	3,985,800	Oct. 12, 1976
B 393,970	3,914,638	Oct. 21, 1975
B 394,088	3,914,740	Oct. 21, 1975
B 394,188	3,924,591	Dec. 9, 1975
B 394,300	3,914,159	Oct. 21, 1975
B 394,712	3,916,306	Oct. 28, 1975
B 395,478	3,922,577	Nov. 25, 1975
B 395,496	3,919,435	Nov. 11, 1975
B 395,671	3,920,418	Nov. 18, 1975
B 395,889	3,913,190	Oct. 21, 1975
B 396,025	3,913,869	Oct. 21, 1975
B 396,551	3,921,929	Nov. 25, 1975
B 397,027	3,923,736	Dec. 2, 1975
B 397,527	3,913,488	Oct. 21, 1975
B 397,990	3,914,848	Oct. 28, 1975
B 398,262	3,913,481	Oct. 21, 1975
B 398,551	3,924,924	Dec. 9, 1975
B 398,597	3,913,743	Oct. 21, 1975
B 398,625	3,920,996	Nov. 18, 1975
B 399,292	3,914,810	Oct. 28, 1975
B 399,304	3,919,567	Nov. 11, 1975
B 399,349	3,925,694	Dec. 9, 1975
B 399,766	3,915,667	Oct. 28, 1975
B 400,080	3,925,163	Dec. 9, 1975
B 400,293	3,923,719	Dec. 2, 1975
B 400,310	3,915,507	Oct. 28, 1975
B 401,133	3,924,443	Dec. 9, 1975
B 401,992	3,924,898	Dec. 9, 1975
B 402,065	3,925,413	Dec. 9, 1975
B 402,555	3,914,688	Oct. 21, 1975
B 403,140	3,913,486	Oct. 21, 1975
B 403,355	3,913,352	Oct. 21, 1975
B 403,990	3,914,684	Oct. 21, 1975
B 403,996	3,916,016	Oct. 28, 1975
B 404,290	3,924,918	Dec. 9, 1975
B 404,437	3,915,200	Oct. 28, 1975
B 405,136	3,915,565	Oct. 28, 1975
B 405,137	3,915,566	Oct. 28, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 405,160	3,924,821	Dec. 9, 1975
B 405,248	3,926,294	Dec. 16, 1975
B 405,305	3,922,111	Nov. 25, 1975
B 405,360	3,913,403	Oct. 21, 1975
B 405,495	3,924,577	Dec. 9, 1975
B 405,938	3,920,109	Nov. 18, 1975
B 406,065	3,914,199	Oct. 21, 1975
B 406,357	3,924,529	Dec. 9, 1975
B 406,800	3,952,708	Apr. 27, 1976
B 407,357	3,924,614	Dec. 9, 1975
B 407,728	3,925,240	Dec. 9, 1975
B 407,736	3,924,463	Dec. 9, 1975
B 408,380	3,984,172	Oct. 5, 1976
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 425,770	3,989,817	Nov. 2, 1976
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,149	4,037,175	July 19, 1977
B 430,385	4,001,104	Jan. 4, 1977
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 447,417	4,024,727	May 24, 1977
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977	B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977	B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977	B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976	B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976	B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976	B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977	B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977	B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977	B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976	B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977	B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976	B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976	B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976	B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976	B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977	B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977	B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977	B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977	B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976	B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977	B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976	B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976	B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976	B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976	B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977	B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977	B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977	B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977	B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976	B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976	B 449,989	4,061,572	Mar. 30, 1976	Dec. 6, 1977
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977	B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976	B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977	B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977	B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976	B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976	B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976	B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976	B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976	B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977	B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976	B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977	B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976	B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976	B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976	B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977	B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977	B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976	B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977	B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977	B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976	B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977	B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976	B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976	B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977	B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977	B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977	B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976	B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976	B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976	B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976	B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976	B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977	B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976	B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977	B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976	B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977	B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976	B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976	B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976	B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976	B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977	B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977	B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976	B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977	B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976	B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976	B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976	B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976	B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976	B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976	B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977	B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977	B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976	B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976	B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976	B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977	B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976	B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976	B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976	B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976	B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976	B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976	B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976	B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977	B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976	B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976	B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977	B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976	B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976	B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976	B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976	B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976	B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976	B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976	B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976	B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976	B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976	B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977	B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976	B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977	B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977	B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977	B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977	B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976	B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976	B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976	B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977	B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976	B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976	B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976	B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976	B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977	B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976	B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977	B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977	B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977	B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976	B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976	B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976	B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976	B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976	B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977	B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 471,706	4,076,275	Mar. 16, 1976	Feb. 28, 1978	B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976	B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976	B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976	B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976	B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976	B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977	B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977	B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976	B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976	B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976	B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976	B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976	B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976	B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976	B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977	B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977	B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976	B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976	B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976	B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976	B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977	B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976	B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976	B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977	B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977	B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976	B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976	B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977	B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976	B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976	B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976	B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976	B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976	B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976	B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976	B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976	B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976	B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976	B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976	B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976	B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977	B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976	B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976	B 501,128	4,072,723	Feb. 24, 1976	Feb. 7, 1978
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977	B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976	B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976	B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976	B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976	B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977	B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976	B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976	B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977	B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976	B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976	B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977	B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976	B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976	B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977	B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976	B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977	B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977	B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976	B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977	B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976	B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976	B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977	B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976	B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977	B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976	B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 494,439	4,057,521	Apr. 13, 1976	Nov. 8, 1977	B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977	B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976	B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976	B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976	B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976	B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 495,124	4,060,968	Mar. 9, 1976	Dec. 6, 1977	B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976	B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976	B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976	B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976	B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976	B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976	B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976	B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976	B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977	B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976	B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976	B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976	B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976	B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976	B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976	B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976	B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976	B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976	B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008 608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,216	4,076,261	Feb. 17, 1976	Feb. 28, 1978
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 537,990	4,057,651	Jan. 13, 1976	Nov. 8, 1977
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 632,416	4,076,698	Mar. 9, 1976	Feb. 28, 1978
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

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Addressograph-Multigraph Corporation: *See*—
Baltazzi, Evan S., Re. 29,554, Cl. 96-1.50R.

Adelstein, Gilbert W., to G. D. Searle & Co. 1,1-Diaryl-1-oxadiazol-alkylamines. Re. 29,556, Cl. 260-293.540.

ASEA Aktiebolag: *See*—
Frank, Kjell; and Thorborg, Kjeld, Re. 29,560, Cl. 363-71.000.

Baltazzi, Evan S., to Addressograph-Multigraph Corporation. Organic photoconductive members comprising dicyanomethylene substituted fluorene sensitizers. Re. 29,554, Cl. 96-1.50R.

Bannister, Brian, to Upjohn Company, The. Lincomycin analogs. Re. 29,558, Cl. 536-11.000.

Becton, Dickinson Electronics Company: *See*—
Epstein, Howard C., Re. 29,559, Cl. 310-360.000.

Bolton, Douglas R., to Cadaco, Inc. Magnetic game structure. Re. 29,552, Cl. 273-95.00R.

Burton, Robert S., III; and French, Gordon B., to Occidental Oil Shale, Inc. Oil shale retort flue gas cooling and cleaning. Re. 29,553, Cl. 299-2.000.

Cadaco, Inc.: *See*—
Bolton, Douglas R., Re. 29,552, Cl. 273-95.00R.

Canning, John L.; and Lottig, Robert W., to SCM Corporation. Low shrink thermosetting polyesters. Re. 29,555, Cl. 260-22.0CB.

Epstein, Howard C., to Becton, Dickinson Electronics Company. Compression accelerometer utilizing a lithium niobate piezoelectric crystal. Re. 29,559, Cl. 310-360.000.

Feichtner, John D.: *See*—
Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., Re. 29,557, Cl. 423-299.000.

Frank, Kjell; and Thorborg, Kjeld, to ASEA Aktiebolag. Peak load levelling system. Re. 29,560, Cl. 363-71.000.

French, Gordon B.: *See*—
Burton, Robert S., III; and French, Gordon B., Re. 29,553, Cl. 299-2.000.

G. D. Searle & Co.: *See*—
Adelstein, Gilbert W., Re. 29,556, Cl. 260-293.540.

Gottlieb, Milton S.: *See*—
Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., Re. 29,557, Cl. 423-299.000.

Hughes Aircraft Company: *See*—
Zurcher, Rudolf F.; and Merles, I. Benjamin, Re. 29,551, Cl. 58-88.00C.

Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., to Westinghouse Electric Corporation. Tl_3PSe_4 Compound, single crystals, and acousto-optical devices. Re. 29,557, Cl. 423-299.000.

Lottig, Robert W.: *See*—
Canning, John L.; and Lottig, Robert W., Re. 29,555, Cl. 260-22.0CB.

Merles, I. Benjamin: *See*—
Zurcher, Rudolf F.; and Merles, I. Benjamin, Re. 29,551, Cl. 58-88.00C.

Occidental Oil Shale, Inc.: *See*—
Burton, Robert S., III; and French, Gordon B., Re. 29,553, Cl. 299-2.000.

Price, Andrea A.: *See*—
Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., Re. 29,557, Cl. 423-299.000.

SCM Corporation: *See*—
Canning, John L.; and Lottig, Robert W., Re. 29,555, Cl. 260-22.0CB.

Thorborg, Kjeld: *See*—
Frank, Kjell; and Thorborg, Kjeld, Re. 29,560, Cl. 363-71.000.

Upjohn Company, The: *See*—
Bannister, Brian, Re. 29,558, Cl. 536-11.000.

Westinghouse Electric Corporation: *See*—
Isaacs, Thelma J.; Gottlieb, Milton S.; Feichtner, John D.; and Price, Andrea A., Re. 29,557, Cl. 423-299.000.

Zurcher, Rudolf F.; and Merles, I. Benjamin, to Hughes Aircraft Company. Electronic watch movement mounting and connection. Re. 29,551, Cl. 58-88.00C.

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Acme Highway Products Corporation: *See*—
Puccio, Guy S., 247,373, Cl. D25-75.000.
Puccio, Guy S., 247,374, Cl. D25-75.000.

Adkins, John S. Golf club putter head. 247,381, 2-28-78, Cl. D34-5.0GH.

Adkins, John S. Golf club putter head. 247,382, 2-28-78, Cl. D34-5.0GH.

Adkins, John S. Golf club iron head. 247,383, 2-28-78, Cl. D34-5.0GH.

American Cyanamid Company: *See*—
Grodin, Adam J.; and Tiboldo, Charles J., 247,346, Cl. D9-12.000.
Grodin, Adam J., 247,348, Cl. D9-64.000.

Barthropp, Francis M. L., to Barton of Canada Ltd. Liquid container closure cap. 247,351, 2-28-78, Cl. D9-285.000.

Barton of Canada Ltd.: *See*—
Barthropp, Francis M. L., 247,351, Cl. D9-285.000.

Benstock, Gerald M., to Superior Surgical Mfg. Co., Inc. Laundry bag. 247,340, 2-28-78, Cl. D7-162.000.

Cal Custom Accessories, Inc.: *See*—
Pelly, Charles W., 247,341, Cl. D7-164.000.

Carr, Peter B., to Wilkinson Sword Ltd. Packaging tray for containing and dispensing razor blade units. 247,349, 2-28-78, Cl. D9-186.000.

Chasen, Lee Richard, to Coats & Clark, Inc. Wall mounted stand for potted plants or the like. 247,337, 2-28-78, Cl. D6-137.000.

Coats & Clark, Inc.: *See*—
Chasen, Lee Richard, 247,337, Cl. D6-137.000.

Coleman, Gary W. Bottle bag. 247,392, 2-28-78, Cl. D87-1.00R.

Colgate-Palmolive Company: *See*—
Klingaman, Richard James, 247,347, Cl. D9-40.000.

Combi Co., Ltd.: *See*—
Nakao, Shinroku, 247,384, Cl. D34-15.0JJ.

Construction Specialties, Inc.: *See*—
Hallock, Edward C.; and Polifka, Michael, 247,375, Cl. D25-87.000.

Cray Research, Inc.: *See*—
Cray, Seymour R., Jr.; and Roush, Maurice Dean, 247,361, Cl. D14-40.000.

Cray, Seymour R., Jr.; and Roush, Maurice Dean, to Cray Research, Inc. Computer cabinet. 247,361, 2-28-78, Cl. D14-40.000.

Dame, Ronald L. Novelty hat. 247,333, 2-28-78, Cl. D2-250.000.

Data Packaging Corporation: *See*—
Lowry, Alan, 247,393, Cl. D87-1.00D.

Ditto, Donald R. Sculpture. 247,355, 2-28-78, Cl. D11-137.000.

Drackett Co.: *See*—
Jones, David A.; and Pardo, John, 247,366, Cl. D23-17.000.

Dragan, William B. Dental face bow bite fork. 247,367, 2-28-78, Cl. D24-10.000.

Dranger, Jan; and Huldt, Johan, to Innovator Design AB. Sofa. 247,335, 2-28-78, Cl. D6-63.000.

Earl, Richard L. Combined key ring and comb. 247,395, 2-28-78, Cl. D87-8.100.

Ewen, Warren. Truck body rock shield. 247,359, 2-28-78, Cl. D12-190.000.

Figur, Bernd: *See*—
Stuetzer, Franz Alban; and Figur, Bernd, 247,378, Cl. D27-42.000.

Fisher, Morris F., to Futorian Corporation. Chair. 247,336, 2-28-78, Cl. D6-71.000.

Flambeau Products Corporation: *See*—
Hellman, Werner, 247,386, Cl. D34-15.0AH.

Futorian Corporation: *See*—
Fisher, Morris F., 247,336, Cl. D6-71.000.

Garrett Corporation, The: *See*—
Miller, Ralph A.; and White, Randall F., 247,358, Cl. D12-81.000.

Gray, Michael Wade. Hydroponic tank. 247,357, 2-28-78, Cl. D11-156.000.

Grodin, Adam J.; and Tiboldo, Charles J., to American Cyanamid Company. Bottle package. 247,346, 2-28-78, Cl. D9-12.000.

Grodin, Adam J., to American Cyanamid Company. Decanter. 247,348, 2-28-78, Cl. D9-64.000.

Hallock, Edward C.; and Polifka, Michael, to Construction Specialties, Inc. Facing panel for facades or the like. 247,375, 2-28-78, Cl. D25-87.000.

Hamaguchi, Kazuhiro; and Oku, Yasuaki, to Kabushiki-Kaisha Taiyo. Exhaust gas diffuser for an automobile engine. 247,360, 2-28-78, Cl. D12-194.000.

Hashino, Minoru. Hair dryer. 247,379, 2-28-78, Cl. D28-17.000.

Hazama, Shigetoshi; and Yamagami, Masafumi, to Sharp Kabushiki

Kaisha. Electronic calculating machine. 247,391, 2-28-78, Cl. D64-11.00B.
Heininger, Oskar, to Williamson Corporation. Infra-red radiometer. 247,352, 2-28-78, Cl. D10-46.000.
Hellman, Werner, to Flambeau Products Corporation. Return top. 247,386, 2-28-78, Cl. D34-15.0AH.
Hughes, Leonard. Student-programmable educational instrumentation device. 247,363, 2-28-78, Cl. D19-60.000.
Huldt, Johan: *See—*
Dranger, Jan; and Huldt, Johan, 247,335, Cl. D6-63.000.
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Jokari/U.S., Inc.: *See—*
Spivey, Lindsey G., II, 247,387, Cl. D34-15.00P.
Jones, David A.; and Pardo, John, to Drackett Co. Spray pump. 247,366, 2-28-78, Cl. D23-17.000.
Kabushiki Kaisha Sato Kenkyusho: *See—*
Sato, Yo, 247,389, Cl. D64-10.000.
Sato, Yo, 247,390, Cl. D64-10.000.
Kabushiki-Kaisha Taiyo: *See—*
Hamaguchi, Kazuhiro; and Oku, Yasuaki, 247,360, Cl. D12-194.000.
Kimberly-Clark Corporation: *See—*
Whitehead, Howard A., 247,368, Cl. D24-51.000.
Whitehead, Howard A., 247,369, Cl. D24-51.000.
Whitehead, Howard A., 247,370, Cl. D24-51.000.
Whitehead, Howard A., 247,371, Cl. D24-51.000.
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Klingaman, Richard James, to Colgate-Palmolive Company. Combined bottle and cap. 247,347, 2-28-78, Cl. D9-40.000.
Kuramoto, Takeo, to Kyoritsu Electrical Instruments Works, Ltd. Portable volt-ohm-ammeter or the like. 247,353, 2-28-78, Cl. D10-79.000.
Kurozumi, Shigeru, to Sharp Kabushiki Kaisha. Cash register. 247,388, 2-28-78, Cl. D52-4.00A.
Kyoritsu Electrical Instruments Works, Ltd.: *See—*
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Rowlands, Kenneth C.; Linde, John P.; and Soucy, Kenneth W., 247,365, Cl. D22-99.000.
Linke, Norbert H. J., to S. T. Dupont. Luggage case. 247,394, 2-28-78, Cl. D87-5.00F.
Lowry, Alan, to Data Packaging Corporation. Cassette cabinet. 247,393, 2-28-78, Cl. D87-1.00D.
Miller, Ralph A.; and White, Randall F., to Garrett Corporation, The. Segmented helicopter float. 247,358, 2-28-78, Cl. D12-81.000.
Monarch Marking Systems, Inc.: *See—*
Mulholland, Robert P., 247,345, Cl. D8-383.000.
Mulholland, Robert P., to Monarch Marking Systems, Inc. Coupling for a lanyard. 247,345, 2-28-78, Cl. D8-383.000.
Nakao, Shinroku, to Combi Co., Ltd. Combined toy boat and figures therefor. 247,384, 2-28-78, Cl. D34-15.0JJ.
Nally, Phillip L. Sweatshirt. 247,331, 2-28-78, Cl. D2-215.000.
Nitta, Tomio. Disposable cigarette gas lighter. 247,377, 2-28-78, Cl. D27-42.000.
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Polifka, Michael: *See—*
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Puccio, Guy S., to Acme Highway Products Corporation. Compression seal. 247,374, 2-28-78, Cl. D25-75.000.
Puckett, J. D. Tractor. 247,362, 2-28-78, Cl. D15-23.000.
Quan, Edward. Hockey face mask. 247,332, 2-28-78, Cl. D2-233.000.
Reiback, Earl M. Combined plant container and support. 247,339, 2-28-78, Cl. D6-182.000.
Remington Arms Company, Inc.: *See—*
Rowlands, Kenneth C.; Linde, John P.; and Soucy, Kenneth W., 247,365, Cl. D22-99.000.
Rideau, Sidney N. Audible amusement castle. 247,385, 2-28-78, Cl. D34-15.0LL.
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S. T. Dupont: *See—*
Linke, Norbert H. J., 247,394, Cl. D87-5.00F.
Sasaki, Kyozo. Sporting shoe. 247,334, 2-28-78, Cl. D2-309.000.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Labeling machine. 247,389, 2-28-78, Cl. D64-10.000.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Portable labeling machine. 247,390, 2-28-78, Cl. D64-10.000.
Schulz, Robert E. Retainer for fishing lines. 247,364, 2-28-78, Cl. D22-25.000.
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Silver, Louis J. Scouring implement. 247,342, 2-28-78, Cl. D7-178.000.
Sinclair, Robert. Line marker buoy. 247,354, 2-28-78, Cl. D10-107.000.
Smith, Edward J. Fireplace grate. 247,343, 2-28-78, Cl. D7-207.000.
Smith, Edward J. Fireplace grate. 247,344, 2-28-78, Cl. D7-207.000.
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Whitehead, Howard A., to Kimberly-Clark Corporation. Contoured sanitary napkin. 247,370, 2-28-78, Cl. D24-51.000.
Whitehead, Howard A., to Kimberly-Clark Corporation. Contoured sanitary napkin. 247,371, 2-28-78, Cl. D24-51.000.
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Wright, Herbert E. Combined lamp and plant support or the like. 247,356, 2-28-78, Cl. D11-144.000.
Yamagami, Masafumi: *See—*
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Yoshinaga Prince Co., Ltd.: *See—*
Yoshinaga, Sadao, 247,376, Cl. D27-39.000.
Yoshinaga, Sadao, to Yoshinaga Prince Co., Ltd. Cigarette lighter. 247,376, 2-28-78, Cl. D27-39.000.

CLASSIFICATION OF PATENTS

ISSUED FEBRUARY 28, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

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345 R	4,075,721
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CLASS 11

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CLASS 13

9 R	4,076,954

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72.5	4,075,729

CLASS 15

245	4,075,730
250.42	4,075,731
301	4,075,732
322	4,075,733

CLASS 16

58	4,075,734
145	4,075,735

CLASS 17

42	4,075,736
45	4,075,737

CLASS 19

234	4,075,738
240	4,075,739

CLASS 21

2.7 A	4,076,501

CLASS 23

230 R	4,076,502
259	4,076,503
277 C	4,076,504

CLASS 24

31 B	4,075,740
201 TR	4,075,741
211 R	4,075,742

CLASS 28

224	4,075,744
243	4,075,745
263	4,075,743
264	4,075,746

CLASS 29

18	4,075,747
225	4,075,748
268	4,075,749
278	4,075,750
432.1	4,075,751
434	4,075,752
568	4,075,753
571	4,075,754
623	4,075,755
625	4,075,756
	4,075,757
628	4,075,758
629	4,075,759

CLASS 30

220	4,075,760

CLASS 32

27	4,075,761

CLASS 33

77	4,075,762
172 R	4,075,763
324	4,075,764

CLASS 34

20	4,075,765
57 D	4,075,766
92	4,075,767
116	4,075,768

CLASS 35

1	4,075,769
30	4,075,770
31 R	4,075,771

CLASS 36

43	4,075,772

CLASS 40

11 R	4,075,773
109	4,075,774
553	4,075,775

CLASS 43

24	4,075,776
41.2	4,075,777
42.31	4,075,778
100	4,075,779

CLASS 44

1 R	4,076,505

CLASS 46

13	4,075,780
74 D	4,075,781
118	4,075,782

CLASS 47

1.41	4,075,783
9	4,075,784
64	4,075,785
84	4,075,786

CLASS 49

209	4,075,787
324	4,075,788

CLASS 51

94 CS	4,075,790
142	4,075,791
165.92	4,075,792
170 TL	4,075,793
307	4,076,506
340	4,075,794
436	4,075,789

CLASS 52

8	4,075,795
20	4,075,796
36	4,075,797
79.5	4,075,814
168	4,075,798
169.5	4,075,799
	4,075,800
196	4,075,801
203	4,075,802
220	4,075,803
232	4,075,804
309.12	4,075,805
395	4,075,811
403	4,075,806
407	4,075,807
439	4,075,808
514	4,075,809
585	4,075,810
747	4,075,812
	4,075,813

CLASS 53

32	4,075,815
74	4,075,816
124 A	4,075,817
180 R	4,075,818
248	4,075,819
329	4,075,820
376	4,075,821

CLASS 55

1	4,076,507
309	4,076,508
320	4,076,509

CLASS 56

1	4,075,822
14.6	4,075,823
	4,075,824

CLASS 58

23 AC	4,075,827
23 R	4,075,825
	4,075,826
88 C	Re.29,551
90 R	4,075,828
152 T	4,075,829

CLASS 60

39.05	4,075,831
245	4,075,832
262	4,075,833
276	4,075,834
	4,075,835
282	4,075,836
	4,075,837
325	4,075,838
327	4,075,839
422	4,075,840
444	4,075,841
445	4,075,842
487	4,075,843
524	4,075,844
527	4,075,845
	4,075,846
	4,075,847
548	4,075,848
602	4,075,849
633	4,075,850

CLASS 61

22 A	4,075,851
35	4,075,852
36 R	4,075,853
45 C	4,075,856
45 D	4,075,857
45 R	4,075,855
53	4,075,859
53.5	4,075,858
87	4,075,860
105	4,075,861
110	4,075,862

CLASS 62

138	4,075,863
180	4,075,864
183	4,075,865
274	4,075,866
323	4,075,867
347	4,075,868
374	4,075,869

CLASS 64

9 R	4,075,870
17 R	4,075,871
23.7	4,075,872
29	4,075,873

CLASS 65

3 A	4,076,510
27	4,076,511
29	4,076,512
33	4,076,513
106	4,076,514

CLASS 66

192	4,075,874

CLASS 68

5 D	4,075,875
18 F	4,075,876

CLASS 70

34	4,075,877
49	4,075,878
337	4,075,879

CLASS 71

10	4,076,515
66	4,076,516
86	4,076,517
100	4,076,518
103	4,076,519

CLASS 72

64	4,075,880
270	4,075,881

CLASS 73

1 F	4,075,882
88 E	4,075,885
88 R	4,075,886
91	4,075,884
141 R	4,075,887
146	4,075,888
	4,075,889
295	4,075,890
483	4,075,891
495	4,075,892
620	4,075,883

CLASS 74

3	4,075,893
15.69	4,075,894
61	4,075,895
69	4,075,896
86	4,075,897
89.15	4,075,898
102	4,075,899
217 S	4,075,900
226	4,075,901
230.17 C	4,075,902
493	4,075,903
501 P	4,075,904
501 R	4,075,905
513	4,075,906
523	4,075,907
527	4,075,908
573 R	4,075,909
785	4,075,910
816	4,075,911
867	4,075,912

CLASS 75

5	4,076,520
24	4,076,521
58	4,076,522
77	4,076,523
123 J	4,076,524
128 B	4,076,525

CLASS 81

177 UJ	4,075,913

CLASS 82

1 C	4,075,914
33 R	4,075,915
78	4,075,916

CLASS 83

422	4,075,917
659	4,075,918
676	4,075,919
745	4,075,920

CLASS 84

1.16	4,075,921
402	4,075,922

CLASS 85

1 T	4,075,923
3 R	4,075,924
64	4,075,925

CLASS 89

16	4,075,926

CLASS 90

11 D	4,075,927

CLASS 91

29	4,075,928
168	4,075,929
361	4,075,930
402	4,075,931
488	4,075,932
506	4,075,933

CLASS 92

159	4,075,934
243	4,075,935

CLASS 93

1 C	4,075,936
77 FT	4,075,937

CLASS 96

1 PE	4,076,527
1.5 R	Re.29,554
	4,076,526
3	4,076,529
11	4,076,538
29 R	4,076,530
35	4,076,531
48 HD	4,076,532
56.5	4,076,533
63	4,076,534
67	4,076,535
75	4,076,536
88	4,076,537
105 R	4,076,528
114.5	4,076,539

CLASS 99

345	4,075,939
377	4,075,940

CLASS 100

19 R	4,075,941
42	4,075,942

CLASS 101

93.48	4,075,943
94	4,075,944
111	4,075,945

CLASS 102

52	4,075,946

CLASS 104

23 FS	4,075,947
138 R	4,075,948
162	4,075,949

CLASS 105

197 A	4,075,950
199 C	4,075,951
282 R	4,075,952

CLASS 106

15 FP	4,076,540
47 Q	4,076,541
52	4,076,542
53	4,076,543
54	4,076,544
89	4,076,546
109	4,076,547
288 B	4,076,548
	4,076,549
288 Q	4,076,550
291	4,076,551

CLASS 110

8 F	4,075,953

CLASS 112

68	4,075,954
79 R	4,075,955
121.27	4,075,956
153	4,075,957
163	4,075,958
225	4,075,959
256	4,075,960
277	4,075,961
439	4,075,962

CLASS 113

113 R	4,075,963

CLASS 114

40	4,075,964
49	4,075,965
114	4,075,966
243	4,075,967

CLASS 115

17	4,075,969
18 E	4,075,970
41 R	4,075,971

CLASS 118

6	4,075,972
7	4,075,968
	4,075,973
52	4,075,974
318	4,075,975
324	4,075,976
658	4,075,977

CLASS 122

33	4,075,978
235 A	4,075,979

CLASS 123

1 R	4,075,980
8.31	4,075,981
32 EA	4,075,983
32 EH	4,075,982
41.54	4,075,984
73 A	4,075,985
79 R	4,075,986
90.3	4,075,987
97 B	4,075,988
117 R	4,075,989
119 A	4,075,992
	4,075,994
119 C	4,075,990
119 CD	4,075,991
119 EC	4,075,993
139 AW	4,075,995
143 A	4,075,996
148 E	4,075,997
179 H	4,075,998
191 A	4,075,999
191 S	4,076,000
	4,076,001
198 A	4,076,002
198 F	4,076,003

CLASS 124

5	4,076,004
24 R	4,076,005
64	4,076,006

CLASS 125

30 R	4,076,007

CLASS 126

25 R	4,076,008
120	4,076,009
	4,076,010
121	4,076,011
164	4,076,012
270	4,076,013
	4,076,014
271	4,076,015
	4,076,016
	4,076,024
	4,076,025
	4,076,026

CLASS 127

50	4,076,552

CLASS 128

2 F	4,076,017
6	4,076,018
83	4,076,019
98	4,076,020
145.6	4,076,021
149	4,076,022
214 R	4,076,023
272	4,076,027
303.13	4,076,028
425	4,076,029

CLASS 131

17 R	4,076,030
261 A	4,076,031

CLASS 132

9	4,076,032

CLASS 134

6	4,076,553
10	4,076,554
172	4,076,033

CLASS 137

15	4,076,034
118	4,076,036
230	4,076,037
318	4,076,038
344	4,076,039
371	4,076,040
490	4,076,041
494	4,076,042
539.5	4,076,043
601	4,076,035
614.11	4,076,044
625.65	4,076,045
627.5	4,076,046
856	4,076,047

CLASS 139

190	4,076,048
434	4,076,049
436	4,076,050
	4,076,051
439	4,076,052

449 4,076,053
453 4,076,054

CLASS 140

92.2 4,076,055
119 4,076,056

CLASS 141

1 4,076,057
1.1 4,076,058
390 4,076,059

CLASS 144

3 D 4,076,060
3 K 4,076,061
193 A 4,076,062

CLASS 148

1.5 4,076,555
4,076,556
4,076,557
4,076,558
4,076,559
11.5 C 4,076,560
103 4,076,561

CLASS 149

7 4,076,562
37 4,076,563

CLASS 150

.5 4,076,063

CLASS 151

14 R 4,076,064

CLASS 152

210 4,076,065
354 R 4,076,066
381.6 4,076,067

CLASS 156

125 4,076,565
153 4,076,566
219 4,076,567
229 4,076,568
242 4,076,569
244 4,076,570
305 4,076,571
603 4,076,572
613 4,076,573
616 R 4,076,574
656 4,076,575
664 4,076,564

CLASS 159

13 B 4,076,576
47 R 4,076,577

CLASS 160

107 4,076,068

CLASS 162

5 4,076,578
53 4,076,579
159 4,076,580
167 4,076,581
272 4,076,582

CLASS 164

303 4,076,070
448 4,076,069

CLASS 165

2 4,076,071
41 4,076,072
53 4,076,073
4,076,074
105 4,076,075
171 4,076,076

CLASS 166

271 4,076,078
308 4,076,079
315 4,076,077

CLASS 172

804 4,076,080

CLASS 173

137 4,076,081

CLASS 174

52 FP 4,076,955

CLASS 175

14 4,076,082
65 4,076,083
73 4,076,084
210 4,076,085
297 4,076,086
334 4,076,087

CLASS 176

35 4,076,583
36 R 4,076,584
38 4,076,585
78 4,076,586
86 R 4,076,587

CLASS 177

210 R 4,076,088

CLASS 178

88 4,076,956

CLASS 179

1 AT 4,076,957
1 D 4,076,959
1 SA 4,076,960
1.5 A 4,076,958
2 DP 4,076,961
6.3 R 4,076,962
15 BS 4,076,964
15 BT 4,076,963
16 EC 4,076,965
18 AG 4,076,967
18 BC 4,076,966
84 R 4,076,968
100.4 D 4,076,969
175.2 R 4,076,970
175.3 R 4,076,971

CLASS 180

5 R 4,076,089
6.48 4,076,090
26 4,076,091
68 P 4,076,092
82 R 4,076,093
108 4,076,094
114 4,076,095
133 4,076,096

CLASS 181

147 4,076,097
170 4,076,098
264 4,076,099
290 4,076,100

CLASS 182

3 4,076,101
81 4,076,102

CLASS 184

25 4,076,103

CLASS 187

8.5 4,076,104

CLASS 188

106 A 4,076,105
250 G 4,076,106

CLASS 192

4 A 4,076,107
35 4,076,108
48.4 4,076,109
58 B 4,076,110

CLASS 195

36 C 4,076,588
49 4,076,589
96 4,076,590
103.5 K 4,076,591
4,076,592

CLASS 197

1 R 4,076,111
127 R 4,076,112

CLASS 198

403 4,076,113
425 4,076,114
487 4,076,115

CLASS 200

33 A 4,076,972

CLASS 201

39 4,076,593

CLASS 203

15 4,076,594
51 4,076,595

CLASS 204

1 T 4,076,596
13 4,076,597
43 G 4,076,598
47 4,076,599
55 R 4,076,600
59 R 4,076,601
70 4,076,602
98 4,076,603
4,076,604
108 4,076,605
157.1 R 4,076,606
162 R 4,076,607
195 S 4,076,608
258 4,076,609
290 F 4,076,611
290 R 4,076,610

CLASS 206

45.19 4,076,116
106 4,076,117
268 4,076 118
309 4,076,119
339 4,076,120
390 4,076,121
460 4,076,122
503 4,076,123

CLASS 208

8 4,076,612
108 4,076,613

CLASS 209

13 4,076,614
75 4,076,124
80.5 4,076,125

CLASS 210

5 4,076,615
17 4,076,616
19 4,076,617
30 R 4,076,618
36 4,076,619
45 4,076,620
60 4,076,621
64 4,076,622
77 4,076,623
96 R 4,076,624
274 4,076,625
496 4,076,626
499 4,076,627

CLASS 211

59.1 4,076,126

CLASS 212

10 4,076,127
48 4,076,128

CLASS 213

33 4,076,129

CLASS 214

1 BC 4,076,131
1 PA 4,076,130
16.4 A 4,076,132
17 DA 4,076,133
38 B 4,076,134
300 4,076,135
340 4,076,136
394 4,076,137
518 4,076,138

CLASS 215

11 C 4,076,139
254 4,076,141
256 4,076,140
307 4,076,142

CLASS 219

97 4,076,973
108 4,076,974
483 4,076,975

CLASS 220

2.1 R 4,076,143
367 4,076,144

CLASS 222

1 4,076,145
52 4,076,146
89 4,076,147
144.5 4,076,148
202 4,076,149
368 4,076,150
525 4,076,151
545 4,076,152
600 4,076,153
4,076,154

CLASS 223

68 4,076,155

CLASS 224

2 B 4,076,156
42.1 E 4,076,157
42.25 4,076,158

CLASS 225

3 4,076,159

CLASS 226

82 4,076,160
146 4,076,161

CLASS 227

019 4,076,162

CLASS 228

56 4,076,163
103 4,076,164
136 4,076,165
157 4,076,166
173 F 4,076,167

CLASS 229

43 4,075,168

CLASS 233

14 R 4,076,169
26 4,076,170

CLASS 236

1 G 4,076,171
48 R 4,076,172

CLASS 239

411 4,076,173
492 4,076,174
532 4,076,175

CLASS 241

30 4,076,176
32 4,076,177
33 4,076,178
46.11 4,076,179
154 4,076,180

CLASS 242

18 G 4,076,181
45 4,076,182
67.3 R 4,076,183
75.3 4,076,184
118.41 4,076,185
199 4,076,186

CLASS 244

3.23 4,076,187
98 4,076,188
153 R 4,076,189
4,076,190
173 4,076,191

CLASS 246

247 4,076,192

CLASS 248

4 4,076,193
9 4,076,194
4,076,195
14 4,076,196
15 4,076,197
49 4,076,198
68 R 4,076,199
146 4,076,200
162 4,076,201
188.2 4,076,202
247 4,076,203
500 4,076,204
524 4,076,205

CLASS 249

44 4,076,206
66 R 4,076,207

CLASS 250

206 4,076,977
213 VT 4,076,978
226 4,076,979
270 4,076,980
272 4,076,981
288 4,076,982
341 4,076,983
367 4,076,984
445 T 4,076,985

CLASS 251

1 A 4,076,208
251 4,076,209
285 4,076,210
286 4,076,211
332 4,076,212

CLASS 252

8.1 4,076,630
8.5 C 4,076,628
8.6 4,076,629
8.75 4,076,633
8.8 4,076,631
4,076,632
12 4,076,634
18 4,076,635
25 4,076,636
26 4,076,637
33.2 4,076,638
47.5 4,076,639
62.1 P 4,076,641
62.1 R 4,076,640
78.5 4,076,642
89 R 4,076,643
182 4,076,644
188.3 CL 4,076,645
299 4,076,646
301.4 P 4,076,647
358 4,076,648
440 4,076,649
4,076,650
451 4,076,651
504 4,076,652
532 4,076,653

CLASS 254

60 4,076,213
93 R 4,076,214
4,076,215
98 4,076,216
131 4,076,217
178 4,076,218
187.4 4,076,219

CLASS 260

2.5 AJ 4,076,657
2.5 AM 4,076,654
2.5 HB 4,076,655
2.5 M 4,076,656
2.5 R 4,076,658
8 4,076,659
9 4,076,660
17 R 4,076,661
17.3 4,076,662
17.4 GC 4,076,663
18 N 4,075,830
4,076,664
22 A 4,076,667
22 CB Re.29,555
4,076,665
4,076,666
23.7 M 4,076,668
23.7 R 4,076,669
27 R 4,076,670
28.5 AV 4,076,671
29.2 EP 4,076,673
29.2 M 4,076,672
29.4 R 4,076,676
29.4 UA 4,076,674
4,076,675
29.6 E 4,076,677
31.2 N 4,076,679
31.6 4,076,678
32.6 R 4,076,680
33.6 PQ 4,076,681
34.5 R 4,076,726
37 N 4,076,682
4,076,683
37 SB 4,076,684
42.53 4,076,685
45.75 W 4,076,689
45.8 A 4,076,686
45.8 NT 4,076,687
45.9 QA 4,076,688
45.95 D 4,076,690
47 UA 4,076,691
4,076,742
59 R 4,076,692
75 S 4,076,693
77.5 AM 4,076,695
77.5 MA 4,076,694
78 P 4,076,696
78 UA 4,076,697
79.5 C 4,076,699
88.2 F 4,076,698
97.6 4,076,700
112 B 4,076,701
112.5 R 4,076,702
4,076,703
4,076,704
4,076,705
207 4,076,706
239 D 4,076,707
239.57 4,076,708
256.4 F 4,076,710
4,076,711
4,076,712
263 4,076,713
285.5 4,076,715
288 CE 4,076,716
293.54 Re.29,556
293.75 4,076,717
295 PA 4,076,718
296 R 4,076,719
4,076,720
301 4,076,721
307 H 4,076,722
327 B 4,076,723
338 4,076,724
340.3 4,076,725
340.7 4,076,727
343.4 4,076,728
345.2 4,076,729
345.7 P 4,076,730
346.4 4,076,731
347.3 4,076,732
347.9 4,076,733
369 4,076,734
378 4,076,735
382 4,076,736
397.45 4,076,737
406 4,076,738
410.9 R 4,076,739
455 R 4,076,740
465 F 4,076,741
501.13 4,076,743
501.19 4,076,744
526 R 4,076,745
543 P 4,075,746
561 N 4,076,747
586 F 4,076,748
586 R 4,076,749
590 C 4,076,750
4,076,751
4,076,752
4,076,753
603 C 4,076,754
606.5 B 4,076,756
606.5 P 4,076,755
611 R 4,076,757
618 R 4,076,758
621 C 4,076,759
653.1 R 4,076,760
668 R 4,076,761
676 R 4,076,762
824 R 4,076,763
834 4,076,764
835 4,076,765
850 4,076,766
862 4,076,767
876 B 4,076,768
893 4,076,769

CLASS 261

34 A 4,076,770
159 4,076,771

CLASS 264

0.5 4,076,775
2 4,076,772
3 E 4,076,773
4 4,076,774
13 4,076,776
32 4,076,777
33 4,076,778
39 4,076,779
40.5 4,076,780
40.7 4,076,781
51 4,076,782
78 4,076,783
102 4,076,784
146 4,076,785
4,076,786
250 4,076,787
255 4,076,788
259 4,076,789
266 4,076,790
272 4,076,791

CLASS 266

44 4,076,221
111 4,076,222
158 4,076,223
275 4,076,224

CLASS 267

34 4,076,225
139 4,076,226

CLASS 269

25 4,076,227
49 4,076,228
139 4,076,229
328 4,076,230

CLASS 270

21 4,076,231
54 4,076,232

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	182	247,339
D7—	162	247,340
	164	247,341
	178	247,342
	207	247,343
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	64	247,348
	186	247,349
	275	247,350
	285	247,351
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	107	247,354
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	156	247,357
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